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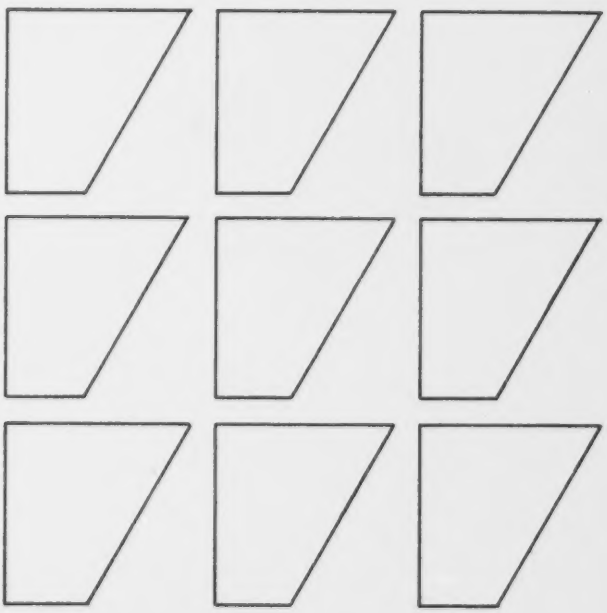
The Role of Gold in Consumer Investment Portfolios

By Lawrence S. Ritter and
Thomas J. Urich



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Biographical Note

Lawrence S. Ritter is Professor of Finance and Economics at New York University. He is former Managing Editor of the Journal of Finance and a past President of the American Finance Association.

Thomas J. Urich is Associate Professor of Economics and Finance at Baruch College, City University of New York. He received his Ph.D. from New York University. Professor Urich has published numerous articles in professional journals in the area of financial markets and investments.

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Abstract

Since early 1968, the price of gold has fluctuated between $35 and $875 a troy ounce. At the end of 1983, the price was $380 an ounce, a 16.1 percent per annum nominal rate of increase over the period since the beginning of 1968. After correcting for inflation, the "real" rate of return over that period was 9.0 percent per annum. Although gold is risky in itself, under many circumstances the addition of gold to a portfolio can provide diversification that reduces total portfolio risk. We conclude that on average 5 to 10 percent of one's total investment portfolio in gold is warranted and prudent, although the proportion that is appropriate for any particular individual depends on such factors as how one views the future and how much risk one feels comfortable bearing.

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Introduction

Historically, gold has played an important role in business and government due to its multiple uses as monetary metal, industrial commodity, investment medium, and store of value. However, it has only been since the mid-1970s that individuals in the United States have focused on gold as an investment vehicle. This is because it was not until 1968 that central banks stopped fixing the private transactions price of gold through official cartel-type agreements. (Official transactions prices were maintained until 1973.) And, of course, it was not until December 31, 1974, that individuals in the United States were permitted to own gold.

For anyone who is interested in gold as an investment, it is important to examine how the price of gold is and has been determined in the financial marketplace. It is also important to examine the risk and return characteristics of gold in an investment portfolio and its future possible role. To this end, the present monograph is organized into five chapters.

Chapter I presents an historical overview of the role of gold in domestic and international finance so that we can appreciate its evolution as a monetary metal. Under the full domestic and international gold standard, which existed in one form or another from the late 1800s until the early 1930s, each nation used to set an official price for gold and then stand ready to buy or sell unlimited amounts at that price. The changing monetary role of gold over the following years until 1968, when the private price of gold was no longer fixed by central bank agreement, provides useful insights into short- and long-term fluctuations in gold prices under various monetary systems. The chapter discusses how gold prices reacted under different international monetary arrangements, what role we see for gold as a monetary metal in the future, and the implications for gold prices in the coming years.

Ultimately, the price of any commodity is determined by demand and supply. For gold, supply is relatively fixed while demand fluctuates in response to political and economic conditions. In Chapter II, the demand for gold and the resulting price is examined in light of political and economic developments during the period 1968 through 1983.

In Chapter III, we examine returns on five other consumer investment assets: silver, housing, Treasury bills, long-term Trea-

sury bonds, and common stocks. The risk and return characteristics of these assets are then compared with those of gold.

Chapter IV analyses gold in a modern investment portfolio context. First, the value of gold as a hedge against inflation is compared to the five alternative assets discussed in Chapter III. Next, we explore the risk and return of portfolios with and without gold—that is, we investigate the ability of gold to reduce the overall risk of a portfolio through diversification without equally offsetting reductions in the portfolio overall return. In an Appendix to the chapter, we present data on the transactions costs of investing in gold bullion coin as distinguished from investing in gold bars; the results presented in the monograph are essentially unaffected by the form of gold purchased.

Finally, in Chapter V, we present a summary of our findings.

I. Background: Gold in Domestic and International Finance

A. From the Gold Standard to Floating Exchange Rates

Since gold is historically a monetary metal as well as an industrial commodity, an investment medium, and a store of value, some understanding of its monetary role is essential in analyzing both short- and long-run fluctuations in its price. Under the traditional full domestic and international gold standard—which has not existed since the early thirties—each nation used to set an official price for gold and then stand ready to buy or sell unlimited amounts at that price.

The Gold Standard Act of 1900, for instance, established $20.67 a troy ounce as the official price of gold. Aside from small handling charges, the United States Treasury would buy any quantity offered at that price, so that no seller had to accept less, and would sell any quantity demanded at that price, so that no buyer had to pay more. As a result, the market price became indistinguishable from the official price, $20.67 a troy ounce.[1]

In March of 1933, in the depths of the Great Depression, Treasury gold sales were suspended and the United States went off the full gold standard. In January of the following year the U.S. returned to a limited form of international gold standard, with a new official gold price of $35 an ounce. However, gold coin and bullion were no longer allowed to circulate domestically: American residents were forbidden to buy or hold gold, except for use in industry and the arts or for numismatic purposes, a ban that remained in effect until the end of 1974. The Treasury did business at the new $35 price only with foreign governments and official monetary institutions.

At $35 an ounce, gold flowed from abroad into the U.S. Treasury's coffers throughout the 1930s and 1940s. The Treasury's gold stock increased from 290 million ounces in 1935 to 700 million at the end of 1949. The 1950s, however, saw a gradual decline in U.S. gold holdings, a decline that turned into a hemorrhage in the 1960s. By 1969 only about 340 million ounces remained, less than half of what the Treasury had owned in 1949. By the end of 1972, the U.S. gold

[1]Gold's weight is customarily measured in troy ounces, which are heavier than the more familiar avoirdupois ounce: one troy ounce = 480 grains while one avoirdupois ounce = 437.5 grains. Thus 1 troy ounce = 1.097 avoirdupois ounces. A metric ton = 32,150 troy ounces.

stock had fallen to 275 million ounces, which was *less* than the amount held in 1935.

The inflow of gold to the U.S. during the thirties and forties was at first due to an initial overvaluation of gold, when its price was raised from $20.67 to $35 an ounce early in 1934. The higher price stimulated both production of newly-mined gold and shipment of both existing and newly-mined metal to the United States. Later, the growth of international tensions and then the outbreak of World War II led to a flight of capital from Europe and Asia and a sharp increase in the rate of gold inflow.

The gold outflow from the U.S. during the fifties stemmed from growing U.S. balance of payments deficits, which supplied dollars to the rest of the world in excess of the demand for dollars to purchase U.S. exports. Many of these foreign-held dollars were kept as international monetary reserves by the nations acquiring them, but a large portion was returned through official channels to the United States Treasury with a request that they be exchanged for gold. Although Americans were forbidden to have gold in their possession, the Treasury maintained full convertibility between dollars and gold for foreign governments and central banks. Indeed, this promise of unlimited conversion of dollars into gold on demand was the linch-pin of the international monetary system in the quarter century immediately following World War II.

By 1960, however, the system was already starting to fall apart. America's short-term dollar liabilities to foreigners had grown larger than its shrinking gold holdings, stimulating rumors that soon the United States might once again raise the official price of gold, just as it had in 1934. Raising the official price of gold—that is, devaluing the dollar—would automatically enlarge the dollar value of America's dwindling gold stock.[2]

In late 1960, in anticipation of gold perhaps soon being worth more than $35 an ounce, a heavy private demand drove its market price up to $40 an ounce in London and Zurich, at that time the location of the world's major free gold markets. Free market gold priced at $40 an ounce threatened the gold reserves of the United States as well as of any other nation willing to sell at the $35 official price. Some foreign central banks were tempted to buy gold through official channels at $35 an ounce and then turn around and sell it to private owners in London or Zurich for $40.

The crisis was resolved early in 1961 when eight of the world's leading financial nations banded together and formally estab-

[2]Raising the official price of gold and devaluing the dollar are one and the same thing. If $35 = 1 troy ounce of gold, it follows that $1 = 1/35th of an ounce of gold. Raising the price of gold to $40 an ounce means that the dollar has been devalued — i.e., each dollar is now worth less gold (namely, 1/40th of an ounce).

lished a "gold pool" to peg the market price at $35. The central banks of the United States, Great Britain, Belgium, Holland, West Germany, Italy, France, and Switzerland began to act in concert, as a syndicate, to sell gold to the free market whenever the price began to rise above $35 and to buy it whenever the price started to fall below.

For seven years the gold pool successfully kept the market price within a few cents of $35 an ounce, at the sacrifice of a considerable loss of gold from central bank reserves. The pool had to keep selling, and hardly ever buying, for the same reason it had been organized to begin with: persistent American balance of payments deficits, feeding dollars abroad, continued to stimulate the same expectations about devaluation of the dollar—an increase in the official price of gold—that had driven up the market price of gold in the first place.

Under the circumstances, it was only a matter of time before the next crisis. It arrived late in 1967, as the war in Southeast Asia heated up and accelerated the flow of U.S. dollars abroad. The private demand for gold was so great that by year's end the central banks in the gold pool had almost $2 billion less gold in their vaults than they had at the start of the year. Seeing no end to the drain, the eight gold pool nations ended the arrangement in March of 1968.

The gold pool was replaced by a "two tier" gold price system. In one tier, the official tier, the leading central banks agreed to buy and sell gold only among themselves, with all transactions taking place at the $35-an-ounce official price. They agreed not to buy any newly-mined gold and not to buy or sell any more gold on private markets. The other tier was represented by the private market, where all newly-mined gold had to be channeled and where the price was free to vary in response to changes in supply and demand.

Thus from March 1968 until November 1973, when the two-tier system fell apart, there were two gold prices: the official price and the free market price. The official price was the price at which all governmental and International Monetary Fund settlements were recorded; this was $35 an ounce until it was increased to $38 in December 1971, and then to $42.22 in February of 1973.

The free market price, however, soared to well over $100 an ounce during this five and one-half year period, reaching the then-record high of $125 in mid-1973. So long as the two tiers did not deal with each other, or with intermediaries, there was no necessary connection between the two prices.

Although the two-tier system worked from early 1968 to late 1973, it contained within itself the seeds of its own destruction: the higher the free market price rose above the decreed official price, the greater became the incentive for those governments with relatively

large holdings of gold to push for worldwide devaluation up to the market price. Or, alternatively, to surreptitiously sell some of their gold on the private market.

As a result of such pressures, the two-tier gold price system collapsed in November of 1973. It had become too difficult to keep the official and private gold markets in separate watertight compartments. The leading central banks stopped acting in concert to hold down the market price of gold and agreed that any who wished were free to buy or sell gold on their own in the lucrative private market.

The postwar international monetary system established at Bretton Woods, New Hampshire, in 1944 was based on the foundation of fixed exchange rates backed by the ultimate convertibility of the dollar into gold at $35 an ounce. The system finally collapsed in 1971 under the weight of persistent U.S. balance of payments deficits which continued to fuel fears that the United States would have to devalue the dollar.

The possibility that the United States might devalue, decreasing the value of the dollar relative to other currencies, led to panic selling of the dollar in the early months of 1971. To maintain fixed exchange rates, as required by the Bretton Woods Agreement, the central banks of "strong money" countries—such as West Germany, Switzerland, and Japan—had to buy up the flood of dollars being offered on the market, for that purpose paying out their own money. Such purchases, like any open market buying by a central bank, laid the basis for an expansion of their domestic money supplies—in most cases contrary to the prevailing monetary policies of the countries involved. In the process of maintain the *external* value of their money, they were losing control over its *internal* value.

West Germany was the first to abandon ship. In early May of 1971, after buying up several billions of dollars in the first few days of the month, West Germany ceased its dollar purchases, stopped supporting fixed exchange rates, and let the mark float to find its own level. Holland did the same, and for a couple of months the crisis seemed to have been weathered successfully.

In early August, however, there was again a renewed flight from dollars. Faced with jittery and panic-prone international financial markets, with $35 billion in the hands of foreign central banks, obligated to pay out gold to any central bank that wanted to exchange its U.S. dollars for it—but with less than $10 billion worth of gold (valued at $35 an ounce) left in the Treasury—on August 15, 1971, President Richard M. Nixon ended the convertibility of the dollar into gold. Thus the United States went off the international gold

standard by executive decree, just as it had gone off the domestic gold standard 38 years earlier, in 1933.

Actually, the termination of the dollar's convertibility into gold caused little disarray in international finance. Everyone had known for the better part of a decade that the commitment of the United States to pay out gold in exchange for dollars was more symbolic than real. If it had ever been put to a real test, it would have ended years before.

Most major countries joined West Germany and Holland and permitted exchange rates to float, with each country's money finding its own value relative to the others on the basis of supply and demand conditions. In mid-December, however, the leading nations resurrected fixed exchange rates as part of a "new look" in international financial arrangements, known as the Smithsonian Agreement. At the same time, the dollar was finally devalued, for the first time since 1934, from the equivalent of 1/35th of an ounce of gold to 1/38th of an ounce. This raised the official price of gold from $35 to $38 an ounce.

The Smithsonian Agreement of December 1971 was hailed by President Nixon as "the most significant monetary agreement in the history of the world." Nevertheless, by February 1973, only fourteen months later, it had almost completely disappeared. At that time the United States again devalued, this time raising the official price of gold an additional 11 percent, to $42.22 an ounce.

The 11 percent devaluation of February 1973 halted panic selling of the dollar only temporarily. In anticipation of *further* devaluation, it soon started again. Finally, in the so-called Brussels Agreement of March 12, 1973, Germany and the major Western European nations decided they had no choice but to let their currencies float relative to the dollar, thereby abandoning fixed exchange rates.

Since March of 1973 the international monetary system has been characterized mainly by floating exchange rates. Several Western European nations fix the value of their monies relative to each other, permitting only limited fluctuations above or below par. And many small less-developed countries peg the international exchange value of their money to that of a larger country, typically a major trading partner. But by and large floating rates predominate, with demand and supply continuously moving foreign exchange rates up and down.

Strictly speaking, floating exchange rates existed "illegally" for almost three years, since the International Monetary Fund's regulations still required fixed rates until early in 1976. Eventually, though, the rules of the game were officially changed at the IMF's

meetings in Kingston, Jamaica, in January 1976. At those meetings the entire structure of mandatory fixed exchange rates based on the convertibility of the dollar into gold, erected at Bretton Woods near the close of World War II, was formally dismantled and a new international monetary system was constructed in its place, one that permits flexible exchange rates, although it does not require them.

The Kingston Agreement of 1976 also "demonetized" the international monetary role of gold by legally abolishing the concept of an "official" gold price. Thus the last remnant of the international gold standard was eliminated.

The last remnant of the gold standard *domestically* had been eliminated several years earlier. In the 1950s and early 1960s, the Federal Reserve had been required to hold reserves of 25 percent in the form of gold certificates, representing gold owned by the Treasury, against its two major liabilities: Federal Reserve Notes (most U.S. currency) and bank deposits at the Federal Reserve Banks (bank reserves).

These gold certificate reserves were considered the ultimate backing behind the money supply of the United States, both currency and demand deposits. Indeed, economics textbooks were fond of portraying the domestic monetary system as an inverted pyramid, with a base of gold that supported an equal volume of gold certificates, above that a fourfold expansion of currency and member bank reserves, and atop that a further multiple expansion of demand deposits.

But then, as the Treasury's gold stock shrank from over $20 billion in 1958 to less than $16 billion at the end of 1964, the gold certificate backing behind member bank reserves was legislated out of existence in March of 1965. Three years later, in March of 1968, the corresponding gold certificate reserve behind Federal Reserve Notes was also abolished. Since then, there has been no legal relationship of any sort between gold and the money supply.

Basically, the gold standard has not been in existence domestically since 1933 or internationally since 1971, although it took until 1968 before all domestic vestigial remnants were eliminated and until 1976 before the same was true internationally.

B. Will the Gold Standard Make a Comeback?

The gold standard still retains considerable appeal for many, who periodically urge that it be reinstated. The gold standard is particularly attractive today because it contains built-in safeguards against inflation, worldwide perhaps the most intractible problem of the postwar period. It does this by rigidly tying the money supply to gold, making it difficult if not impossible to enlarge the money supply

enough to support any sustained increase in the price level. New discoveries of gold could conceivably produce a dramatic increase in the money supply, but barring that possibility the supply of money is held in check by the existing gold stock plus inflows from abroad and more intensive mining of known sources.

This mandatory link between nation's gold stock and its money supply is intended to supplant human judgment with respect to money. In the absence of such a tether, we are at the mercy of politicians and central bankers, few of whom have been notably successful in curbing inflation.

The tie between gold and the money supply is accomplished by (1) imposing a fixed ratio between gold held by the government and currency in circulation (for every $1 of gold, for example, $4 of currency); and (2) permitting unlimited convertibility between gold and currency. Since bank deposits are interchangeable with currency, in effect deposits are also freely convertible into gold.

Supplementary provisions are often added, such as the use of gold coins as part of the money supply and the requirement that currency be backed 100 percent by gold—that is, that the government hold gold dollar for dollar behind all forms of currency. However, these provisions are not essential. Gold coins are a convenience as part of a gold standard but not a necessity, and they do not by themselves mean that a nation has adopted the gold standard. Both Canada and Mexico currently issue gold coins, but neither is on a gold standard.

And while a gold standard does require that gold be held by the government in some stipulated ratio behind its currency, that ratio need not be 100 percent. Fractional gold reserves are based on the same logic as fractional bank reserves: everyone is unlikely to want to turn their money into gold at one and the same time, just as they are unlikely to want to turn their demand deposits into currency simultaneously.

For conversion between gold and currency, an official fixed price of gold has to be legally established, such as $35 = 1 troy ounce of gold. Since this automatically means that $1 is worth 1/35th of an ounce of gold, it is often expressed by saying that a country thereby "defines" its monetary unit in terms of a specified physical amount of gold: the dollar is defined as equal to 1/35th of an ounce of gold.

Neglecting small handling charges, the public would then be free to convert $35 into one ounce of gold at the Treasury whenever they wished, or to turn in one ounce of gold and get $35. Of course, the Treasury has to convince people that it has enough gold to make good on its promises.

This convertibility between currency and gold is the lever that controls the money supply, and through the money supply presumably the price level. This is because many people are convinced, on the basis of experience, that over the long run gold will retain its value better than paper money. Expectations that prices are apt to rise is thus likely to lead the public to exchange currency for gold. And, since bank deposits are freely convertible into currency, to also exchange deposits for currency and then for gold. Inflationary expectations thereby generate their own remedy automatically, without intervention by politicians or central bankers, since the smaller money supply aborts inflation before it can really get underway.[3]

If the gold standard functions so smoothly and contains inflation so effectively, why was it abandoned by the United States (and the rest of the world as well)?

Although the gold standard has built-in safeguards against inflation, the same cannot be said with respect to recession and unemployment. Under the gold standard, the money supply is determined by the public, not by the central bank. Gold hoarding by the public shrinks the money supply and the central bank, if it abides by the rules, cannot do anything about it. This is effective in stopping inflation but is likely to *intensify* a recession, especially if fears arise that the government might possibly devalue (that is, raise the price of gold).

Governments are often tempted to devalue during recessions, in order to increase employment by expanding exports. Devaluation depreciates the foreign exchange value of a country's money, thereby inhibiting its imports and stimulating its exports.

If the public starts to suspect that the government might soon devalue, it makes sense to buy gold now, before the price rises, and then sell it back to the government after the price has gone up. This is precisely what led the United Kingdom and the United States to leave the gold standard fifty years ago. The United Kingdom suspended convertibility of the pound into gold, and thereby went off the gold standard, in September of 1931. The United States followed suit a year and a half later. The reasons were the same in both cases: large gold drains, due to unsettled world economic conditions and persistent rumors of imminent devaluation despite repeated government denials that anything of the sort was contemplated.

Under the gold standard, a country losing gold is supposed to contract its money supply and put deliberate downward pressure on its economy. In the early thirties, both Great Britain and

[3]There are international self-correcting counterparts that are similar to these domestic forces—balance of payments deficits (and surpluses) that generate gold outflows (and inflows).

the United States were indeed losing gold, but understandably neither wanted to impose the tight money called for by the gold standard's rules. Both were in the midst of major depressions that neither wanted to exacerbate by monetary stringency. The generally accepted remedy for a depression is easier, not tighter, money.

Nor did either know, at the time, what new official price to set for gold that would stem the outflow. If they set too high a price, other nations would retaliate and devalue as well; if they set too low a price, the gold outflow would continue. If too much gold was lost, they would be forced off the gold standard anyway. It was easier to simply suspend convertibility and wait to see what happened.

Similar circumstances led to the final breakdown of what was left of the gold standard in the early seventies. The United States resumed convertibility of the (devalued) dollar in 1934, for foreign central banks and governments only. But the system collapsed again in 1971 under the weight of persistent U.S. balance of payments deficits, unstable world financial conditions, and recurrent rumors that the U.S. was again ready to devalue the dollar.

All of which is history. Looking to the future, what are the probabilities that we will return to the gold standard in the foreseeable future? Extremely low, for a number of reasons:

1. It is difficult today, perhaps impossible, to establish a fixed relationship between a nation's gold stock and its money supply. The gold standard was the construct of a simpler monetary era. Most of our money now consist of bank deposits, not currency, and there is even a great deal of controversy about which deposits to include. As a result, we have several different money supplies—M1, M2, M3, and so on—and it is hard to justify why one and not the other should be tied to gold.

2. Just as difficult is the choice of an appropriate official price for gold, given the wide swings in its free market price in recent years. Too low an official price would encourage large scale gold flows from government to private hands, too high a price the reverse.

3. The gold standard has built-in safeguards against inflation but not against recession and unemployment. No democratically elected government could deliberately provoke heavy unemployment, simply because of gold outflows, and expect to remain in office. Indeed, even prior to the 1930s the U.S. "sterilized" the domestic monetary effects of international gold flows by offsetting central bank open market operations—a clear violation of the gold standard's

rules—in order to pursue domestic stabilization objectives unhampered by gold constraints.[4]

For investors in gold who expect that the United States *will* return to the gold standard in the foreseeable future, the most important factor determining the profitability of their investment is what new official price will be established for gold. Since the market price will converge with the official price, only the official price will be relevant. A "high" official price will produce profits while a "low" one will mean losses.

The authors of this monograph assume, however, for the reasons stated above, that the gold standard will *not* be restored in the foreseeable future. Thus there will be no "official" price but rather a free market price determined by supply and demand. What has happened to the market price in the past is relevant information for anticipating what may happen to it in the future. The following chapter therefore analyzes how the market price of gold has behaved, and the forces that have affected it, in the sixteen years since the central bank gold pool was terminated in March of 1968 and the price of gold was allowed to find its own level.

[4]A recent Presidential Commission appointed to study the advisability of returning to the gold standard recommended against it. See the *Report to the Congress of the Commission on the Role of Gold in the Domestic and International Monetary Systems* (U.S. Government Printing Office, March 1982).

II. Supply, Demand, and the Price of Gold, 1968-1983

A. Supply and Demand

It has been estimated that about 2.9 billion troy ounces of gold (roughly 90,000 metric tons) has been extracted from the earth from the beginning of recorded history to the present. Around 300 million ounces, close to 10 percent of it, has been lost in one way or another[5]. Much of the remaining 2.6 billion ounces, about 1.2 billion ounces of it, is held as monetary reserves by various governments and official international organizations. The United States Treasury owns 260 million ounces, international organizations like the International Monetary Fund own 200 million ounces, other non-Communist governments and central banks own 670 million, and the Soviet Union and China possess about 70 million (mostly owned by the Soviet Union).

However, the largest share, about 1.4 billion ounces, remains in private hands. Perhaps half of this has been used for artistic and decorative purposes, including religious ornamentation, and been fabricated into jewelry. The rest, about 700 million ounces, is hoarded in the form of gold coin or bullion: an estimated 200 million ounces is hoarded by private citizens in France, 120 million ounces in the United States, an equal amount in India, with an estimated 260 million ounces scattered throughout the Middle East and the rest of the world.

The annual production of newly-mined gold adds only about 1½ to 2 percent a year to this stock—about 40 to 50 million ounces is mined annually. Approximately half of this usually comes from South Africa, close to 25 percent from the Soviet Union, and slightly less than 5 percent from Canada, the three largest gold producers. In recent years the United States has typically accounted for 2 to 3 percent of new output.

This means that the overwhelming element on the supply side is not the amount of current production, which is only a small portion of the total stock in existence, but uncertainty regarding how much holders of the existing stockpile might decide to sell. For instance, the United States Treasury sold 1.3 million ounces out of its official gold stock in 1975, and another 16 million ounces at regular monthly auctions in 1978 and 1979.

[5]Data in this subsequent paragraphs is from J. Aron & Company, *Gold Statistics and Analysis*, annual.

The 1975 sale was a deliberate attempt to stop a rise in the price of gold, which it succeeded in doing temporarily. The 1978-79 sales were intended to prop up the foreign exchange value of the dollar by improving the U.S. balance of trade through lower gold imports (to the extent that the auctioned gold was purchased by domestic bidders) and by increased gold exports (to the extent it was purchased by foreigners).

Similarly, at the January 1976 International Monetary Fund meetings in Kingston, Jamaica, the IMF decided to sell 25 million ounces of its gold holdings on the open market and use the proceeds to aid developing countries. Auctions held from 1976 through 1980 raised $4.6 billion for this purpose.

On the demand side, a variable portion of the demand for gold is not for industrial, dental, or artistic use but rather is motivated by psychological considerations—in particular, by periodic fears regarding an uncertain social and economic future. Traditionally, gold has been considered a hedge against inflation. When consumer prices threaten to get out of hand, the demand for gold usually expands; when inflation subsides, that demand often contracts just as suddenly. Similar reactions are associated with periods of social and political turbulence. If a government falls, its paper money often falls with it; gold is a traditional refuge from political upheaval. Even moderate changes in demand, impinging on a relatively fixed aggregate supply that cannot be meaningfully increased by current production, can produce substantial price movements.

B. The Price of Gold

Table 1 records the free market price of gold from early 1968, when the central banks abandoned fixing the price through the gold pool, to the end of 1983. Six major price trends are discernible in that sixteen-year period:

1. *From early 1968 to the end of 1974, the market price of gold rose from the official figure of $35 an ounce to a high of $197 an ounce*. This seven-year time span encompassed the turmoil associated with the Viet Nam War, the Watergate hearings, the resignation of the vice-president and the president of the United States, the 1973 Arab oil embargo, and the 1973-74 400 percent OPEC increase in the price of oil. Consumer prices in the United States rose by almost 9 percent in 1973, the highest annual rate of inflation in a quarter century, and then by over 12 percent in 1974. The then-record high of $197 an ounce was reached late in December of 1974.

2. *From January 1975 to August 1976, the price of gold fell from almost $200 an ounce to just over $100.* Americans were legally permitted to own gold on the last day of 1974—for the first time since 1933—which allowed them to buy some just in time to see its value fall by about 50 percent over the next twenty months. Part of the reason the price rise ended in early 1975 was the U.S. Treasury's decision to sell off some of its official gold stock. The Treasury's first auction, at which it sold 750,000 ounces, was held on January 6, 1975. More important, political and social stability returned to the United States and the worldwide pace of inflation slackened: after 12.2 percent inflation in the United States in 1974, prices rose by 7 percent in 1975 and less than 5 percent in 1976.

3. *From August 1976 to near the end of January 1980, however, the price of gold skyrocked from $104 an ounce to an all-time high of $875 an ounce.* This three-and-a-half-year period was marked by accelerating worldwide inflation; in the United States, consumer prices rose by almost 7 percent in 1977, by 9 percent in 1978, by 13.3 percent in 1979, and by over 12 percent in 1980. The price of gold on the London market went over $200 an ounce for the first time in July of 1978 and then kept on rising for the next year and a half almost without interruption. This despite additional gold auctions by the U.S. Treasury in 1978 and 1979 and a series of similar sales by the International Monetary Fund that began in 1976 and continued until mid-1980.

Fueled by monetary instability, oil shortages, the Iranian hostage crisis, and fears of runaway inflation, the rise in the price of gold during the second half of 1979 and the first month of 1980 reached unprecedented proportions. The price passed $300 an ounce in July of 1979, $400 in October, and went over $500 on December 26, 1979. With the flames fanned by the Soviet invasion of Afghanistan on December 30, the price jumped past $600 an ounce in early January. From $684 an ounce in London on January 15, it rose spectacularly to $765 on the 16th, to $820 a few days later, and then to the all-time high of $875 in New York on January 21, 1980.

4. *From January 1980 to June 1982, the price of gold retreated irregularly from its $875 an ounce peak to slightly below $300.* Following the January 21 high of $875, the price of gold in New York plummeted to $450 in late March and then rebounded to the $700 range briefly in late summer, when the war between Iran and Iraq began. Thereafter, it declined rather steadily over the next two years to a trough of $296 on June 21, 1982.

TABLE 1

The Price of Gold Bullion, 1968-1983

	1968	1969	1970	1971	1972	1973	1974	1975
Jan.	$35.20	$42.60	$35.20	$38.35	$47.45	$66.30	$132.80	$176.05
Feb.	35.20	42.95	35.20	39.10	48.50	85.30	162.80	182.00
Mar.	38.85	43.15	35.50	39.15	48.65	90.30	173.30	177.25
Apr.	39.45	43.80	36.10	39.95	49.90	91.00	169.55	167.00
May	42.20	43.45	35.85	41.15	59.75	115.05	157.05	167.20
June	41.05	41.45	35.75	40.40	64.95	123.55	144.55	166.35
July	38.90	41.60	35.55	42.70	68.60	115.90	156.25	166.95
Aug.	39.90	41.10	36.10	41.00	67.15	103.80	156.30	160.00
Sept.	39.60	40.65	36.65	42.90	64.50	100.30	151.55	141.40
Oct.	39.15	40.00	37.55	42.65	64.65	98.30	167.30	143.05
Nov.	40.05	35.80	37.80	43.95	63.90	101.25	184.55	140.70
Dec.	42.05	35.45	37.65	43.85	65.20	112.25	186.75	140.35

TABLE 1

The Price of Gold Bullion, 1968-1983

	1976	1977	1978	1979	1980	1981	1982	1983
Jan.	$128.40	$132.30	$176.10	$233.70	$653.00	$506.50	$387.00	499.50
Feb.	132.55	142.75	182.25	251.55	637.00	489.00	362.60	408.50
Mar.	129.60	148.90	181.60	240.35	495.00	513.75	320.00	411.75
Apr.	128.40	147.25	170.85	245.55	518.00	482.75	361.25	429.25
May	125.50	143.30	184.15	274.85	535.50	479.25	325.25	437.50
June	123.80	143.00	183.05	277.50	653.50	426.00	317.50	416.00
July	112.80	144.35	200.50	296.70	614.25	406.00	342.90	422.00
Aug.	104.35	146.00	208.70	315.35	631.25	427.00	411.50	414.25
Sept.	116.25	154.20	217.10	397.50	666.75	428.75	397.60	405.00
Oct.	123.15	161.50	242.60	382.25	629.00	427.00	423.25	382.00
Nov.	130.25	160.05	193.40	415.90	623.00	414.50	436.00	405.00
Dec.	134.75	164.95	226.00	512.00	586.00	401.00	456.90	381.50

Source: Handy and Harman. Morning price (10:30 A.M.) on last business day of month.

The extent of the rise in the price of gold in 1979 and early 1980 probably made a downward adjustment inevitable. However, it was aided and abetted by a change in the conduct of Federal Reserve policy, announced in October of 1979: the central bank shifted from preoccupation with interest rates to an emphasis on control over bank reserves and the money supply, letting interest rates take care of themselves. As the new Fed policy took hold in 1980 and 1981, it generated historic increases in interest rates and broke the back of the inflationary spiral.

The discount rate was raised to 14 percent plus a 4 percent surcharge for frequent borrowers, 3-month Treasury bill bond-equivalent yields exceeded 17 percent, and the commercial bank prime loan rate hit 21½ percent, in each case an all-time high. Unemployment in the United States swelled to double digits while inflation subsided—from 12.4 percent in 1980 to less than 9 percent in 1981 and less than 4 percent in 1983.

The historically high interest rates that prevailed during much of 1980 and 1981 played a pivotal role in bringing about lower gold prices. In the late seventies, "real" interest rates—market interest rates minus the rate of inflation—had actually been negative. That is, the rate of inflation was often higher than market yields on financial assets. As a result, investors in financial instruments frequently ended up with less purchasing power than they started with. Under the circumstances, they sought alternatives, including gold. While gold yields no interest or dividend income, and may even entail carrying costs, the conventional expectation is that it will rise in price faster than the rate of inflation.

The high positive real interest rates of the early eighties, with market yields well above the inflation rate, enhanced the attractiveness of financial assets relative to non-interest bearing assets, such as gold, silver, diamonds, numismatic coins, rare stamps, and so on. The result was an expansion in the demand for financial assets and a corresponding contraction in the private investment demand for gold and other so-called "collectibles". The worldwide private investment acquisition of gold coins, medallions, and bullion, which had totalled over 22 million ounces in 1979, thus shrank to about 10 million ounces in 1981.

High positive real interest also inhibited business spending on plant and equipment as well as purchases of new homes, both of which helped dampen economic expansion and subdue inflation. Just as the expectation of more inflation typically expands the demand for gold and drives its price up, so the anticipation of less inflation generally contracts demand and pushes the price down.

5. *From June 1982 to the close of the year, the price of gold see-sawed on an upward trend from $296 an ounce to end the year fifty percent higher at about $450 an ounce*. The rise in the price in the second half of 1982 stemmed from an expansion in the demand for gold generally attributed to a renewal of concern over inflation as well as apprehension about the solvency of financial institutions worldwide. At the time, the international financial system was feeling the initial strains associated with the nonrepayment of debt by many third-world and other debtor countries.

6. *From January 1983 to December 1983, the price of gold continued to see-saw, but now on a downward trend, from a peak of about $500 an ounce in January to about $380 an ounce at year-end*. The 1983 period may be generally characterized as once of increased optimism. There was a lowering of inflationary expectations and new optimism about the course of economic activity which can be seen by the high value of the dollar in international markets and the strong performance of the stock market—the return on equities was over 20 percent for the second year in a row. While there was continued concern about the stability of the international financial system, the "good" news about inflation and growth acted as a damper on gold prices.

High positive real interest rates also strongly contributed to the downward pressure on the price of gold. The demand for financial assets expanded as the real rate of return on financial assets remained high, while there was a corresponding shrinkage in the demand for gold as the real opportunity cost of holding it increased. The overall result was a reduction of over $100 in the price of gold from January to December.

C. The Rate of Return

Overall, from the beginning of 1968, when the price of gold was allowed to find its free market level, to the end of 1983, the market price of gold rose from $35 to about $380 an ounce. Over the full 16-year period, this amounts to a 16.1 percent per annum nominal rate of increase.

Table 2, constructed on the basis of the data in Table 1, shows the annual rate of return on gold for the full period, from the start of 1968 to the end of 1983, as well as rates of return for each yearly subperiod. The table shows the per annum rate of return accruing to someone who acquires gold at the start of any year and holds it to the end of the year or the end of any subsequent year.

For example, Table 2 indicates that a purchaser of gold at the start of 1968, who held it until the end of the year, would have earned a 19.5 percent rate of return. If held for two years, until the end of 1969, the annual yield would have plummeted to 0.4 percent . . . but if held for seven years, until the end of 1974, the annual rate of return would have skyrocketed to 26.9 percent.

Casual observation of Table 2 is sufficient to indicate the importance of timing with respect to investment in gold. A purchase at the start of 1975, for instance, would have produced a loss of 24.9 percent if sold at the end of 1975 . . . but yielded a 22.4 percent per annum gain if held until the end of 1979. Similar illustrations abound in Table 2. We will return to the subject of risk in the next chapter.

Table 3 shows annual rates of inflation on the same basis as Table 2's rates of return. Subtracting the rate of inflation in Table 3 from the nominal rate of return in Table 2 produces the "real" rate of return in Table 4.

From the beginning of 1968 to the end of 1983, the pace of inflation as measured by the consumer price index rose at an annual rate of 7.1 percent. Thus since 1968 the "real" rate of return on gold, not taking carrying costs into account, amounted to 9.0 percent. (The 16.1 percent in Table 2 minus the 7.1 percent in Table 3 equals the 9.0 percent in Table 4.)

Another way to show the implications of the rate of return on gold, unadjusted for inflation, is indicated in Table 5, which contains the amounts to which $1 invested in gold would have grown over different time intervals. For instance, $1 invested in gold at the beginning of 1968 would have grown to $1.19 by the end of 1968 . . . to $5.31 by the end of 1974 . . . to $16.65 by the end of 1980 . . . and to $10.84 by the end of 1983. Growth from $1 in 1968 to $10.84 in 1983 is the equivalent of a 16.1 percent annual rate of return (as shown in Table 2).

What have other investments yielded over that time span? How risky has it been to hold gold? To hold other assets? We turn to these and related questions in the following chapter.

TABLE 2

Rate of Return on Gold, 1968-1983

TO THE END OF	FROM THE BEGINNING OF															
	1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	19.5%															
1969	0.4	−15.7%														
1970	2.3	− 5.4	6.2%													
1971	5.7	1.4	11.2	16.5%												
1972	13.1	11.6	22.5	31.6	48.7%											
1973	21.3	21.7	33.4	43.9	60.0	72.2%										
1974	26.9	28.2	39.4	49.2	62.1	69.2	66.4%									
1975	18.9	18.8	25.8	30.1	33.8	29.1	11.8	−24.9%								
1976	16.1	15.7	21.0	23.7	25.2	19.9	6.3	−15.1	− 4.0%							
1977	16.7	16.4	21.2	23.5	24.7	20.4	10.1	− 4.1	8.4	22.4%						
1978	18.4	18.3	22.9	25.1	26.4	23.0	15.0	4.9	17.2	29.5	37.0%					
1979	25.0	25.5	30.6	33.6	36.0	34.2	28.8	22.4	38.2	56.0	76.2	126.6%				
1980	24.2	24.6	29.1	31.6	33.4	31.6	26.6	21.0	33.1	44.4	52.6	61.0	14.5%			
1981	19.0	18.9	22.4	24.0	24.8	22.4	17.3	11.5	19.1	24.4	24.9	21.1	−11.5	−31.6%		
1982	18.6	18.6	21.7	23.1	23.8	21.5	16.9	11.8	18.4	22.6	22.6	19.2	− 3.7	−11.7	13.9%	
1983	16.1	15.8	18.5	19.5	19.8	17.4	13.0	8.3	13.3	16.0	15.0	11.0	− 7.1	−13.3	− 2.5	−16.5%

Source: Table 1.

TABLE 3

The Rate of Inflation, 1968-1983

TO THE END OF	FROM THE BEGINNING OF 1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	4.7%															
1969	5.4	6.1%														
1970	5.4	5.8	5.5%													
1971	4.9	5.0	4.4	3.4%												
1972	4.6	4.6	4.1	3.4	3.4%											
1973	5.3	5.4	5.2	5.2	6.1	8.8%										
1974	6.3	6.5	6.6	6.9	8.1	10.5	12.2%									
1975	6.4	6.6	6.7	6.9	7.8	9.3	9.6	7.0%								
1976	6.2	6.4	6.4	6.6	7.2	8.2	8.0	5.9	4.8%							
1977	6.2	6.4	6.4	6.6	7.1	7.9	7.7	6.2	5.8	6.8%						
1978	6.5	6.7	6.7	6.9	7.4	8.1	7.9	6.9	6.9	7.9	9.0%					
1979	7.0	7.3	7.4	7.6	8.1	8.8	8.8	8.2	8.4	9.7	11.2	13.3%				
1980	7.4	7.7	7.8	8.1	8.6	9.3	9.3	8.9	9.2	10.4	11.6	12.9	12.4%			
1981	7.6	7.8	7.9	8.1	8.6	9.2	9.3	8.9	9.2	10.1	10.9	11.5	10.7	8.9%		
1982	7.3	7.5	7.6	7.8	8.2	8.7	8.7	8.2	8.4	9.0	9.5	9.6	8.4	6.4	4.2%	
1983	7.1	7.2	7.3	7.5	7.8	8.2	8.2	7.7	7.8	8.3	8.5	8.4	7.2	5.6	4.0	3.8%

The rate of inflation was calculated as the percentage change in the Consumer Price Index.

Source: Bureau of Labor Statistics, U.S. Department of Labor.

TABLE 4

"Real" Rate of Return of Gold, 1968-1983

TO THE END OF	FROM THE BEGINNING OF 1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	14.8%															
1969	−5.0	−21.8%														
1970	−3.1	−11.2	0.7%													
1971	0.8	− 3.6	6.8	13.1%												
1972	8.5	7.0	18.4	28.2	45.3%											
1973	16.0	16.3	28.2	38.7	53.9	63.4%										
1974	20.6	21.7	32.8	42.3	54.0	58.7	54.2%									
1975	12.5	12.2	19.1	23.2	26.0	19.8	2.2	−31.9%								
1976	9.9	9.3	14.6	17.1	18.0	11.7	−1.7	−21.0	−8.8%							
1977	10.5	10.0	14.8	16.9	17.6	12.5	2.4	−10.3	2.6	15.6%						
1978	11.9	11.6	16.2	18.2	19.0	14.9	7.1	− 2.0	10.3	21.6	28.0%					
1979	18.0	18.2	23.2	26.0	27.9	25.4	20.0	14.2	29.8	46.3	65.0	113.3%				
1980	16.8	16.9	21.3	23.5	24.8	22.3	17.3	12.1	23.9	34.0	41.0	48.1	2.1%			
1981	11.4	11.1	14.5	15.9	16.2	13.2	8.0	2.6	9.9	14.3	14.0	9.6	−22.2	−40.5%		
1982	11.3	11.1	14.1	15.3	15.6	12.8	8.2	3.6	10.0	13.6	13.1	9.6	−12.1	−18.1	9.9%	
1983	9.0	8.6	11.2	12.0	12.0	9.2	4.8	0.6	5.5	7.7	6.5	2.6	−14.3	−18.9	− 6.5	−20.3%

Source: Tables 2 and 3.

TABLE 5

Amount to Which $1 Invested in Gold Would Grow

TO THE END OF	FROM THE BEGINNING OF 1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	$ 1.19															
1969	1.01	$ 0.84														
1970	1.07	0.90	$ 1.06													
1971	1.25	1.04	1.24	$ 1.16												
1972	1.85	1.55	1.84	1.73	$ 1.49											
1973	3.19	2.67	3.17	2.98	2.56	$1.72										
1974	5.31	4.44	5.27	4.96	4.26	2.86	$1.66									
1975	3.99	3.34	3.96	3.73	3.20	2.15	1.25	$0.75								
1976	3.83	3.20	3.80	3.58	3.07	2.07	1.20	0.72	$0.96							
1977	4.69	3.92	4.65	4.38	3.76	2.53	1.47	0.88	1.18	$1.22						
1978	6.42	5.37	6.38	6.00	5.15	3.47	2.01	1.21	1.61	1.68	$1.37					
1979	14.55	12.18	14.44	13.60	11.68	7.85	4.56	2.74	3.65	3.80	3.10	$2.27				
1980	16.65	13.94	16.53	15.56	13.36	8.99	5.22	3.14	4.18	4.35	3.55	2.59	$1.14			
1981	11.39	9.54	11.31	10.65	9.14	6.15	3.57	2.15	2.86	2.98	2.43	1.77	0.78	$0.68		
1982	12.98	10.87	12.89	12.14	10.42	7.01	4.7	2.45	3.26	3.39	2.77	2.02	0.89	0.78	$1.14	
1983	10.84	9.07	10.76	10.13	8.70	5.85	3.40	2.04	2.72	2.83	2.31	1.69	0.75	0.65	0.95	$0.84

Source: Tables 1 and 2.

III. Looking Backward: Risks and Returns on Alternative Investments

A. Nominal Yields, 1968-1983: Silver, Housing, Treasury Bills, Stocks, and Long-Term Government Bonds

The previous chapter showed that gold yielded a 16.1 percent annual rate of return from 1968 through 1983, increasing in price from $35 to about $380 an ounce. A dollar invested in gold at the beginning of 1968 would have grown to $10.84 by the end of 1983.

In this chapter we examine annual rates of return over the same time interval for five alternative investments: for silver and housing, two alternative non-financial assets, and for Treasury bills, stocks, and long-term government bonds, three alternative financial assets. Chart 1 and Table 1 show the year-by-year cumulative wealth results of investing $1 in gold and in each of the five alternative assets at the end of 1967—in silver, housing, treasury bills, the stock market, and long-term government bonds. Clearly gold, with $1 growing to $10.84 over the entire 16-year time span, would have been the most profitable investment of the six. Silver, stocks, housing, treasury bills, and long-term government bonds follow in that order.

Silver. The price of silver was dominated during this period by the unusual activities of Nelson Bunker Hunt and W. Herbert Hunt of Dallas, Texas. The Hunt brothers amassed silver holdings estimated at over 200 million ounces during 1979 and early 1980 and helped drive up the price of silver to its all-time peak of $50.50 an ounce in mid-January of 1980. Only six months earlier, the price of silver had been below $10 an ounce.

The brokerage firm of Bache Halsey Stuart Shields touched off near panic in the silver market on March 27, 1980, with the announcement that the Hunt brothers had failed to meet $100 million of margin calls on their silver accounts. Bache incurred substantial losses as a result. Subsequently, the Hunts signed an agreement to cover another $400 million in losses that resulted from their silver trading activities. The brothers agreed to turn over oil and gas properties and silver holdings to Engelhard Minerals in exchange for Engelhard's consent to let them out of a contract to buy 19 million ounces of silver at $35 an ounce. The contract came due on March 31st, when silver closed in New York at less than $15 an ounce. As part of the

agreement, Engelhard kept its 19 million ounces of silver, received another 9 million ounces from the Hunts, and also received oil and gas properties valued at several hundred million dollars.

Table 1, in the Appendix at the end of this chapter, shows the noon price of silver on the last business day of each month from 1968 through 1983. Also in the Appendix, Table 2 shows the rate of return on investments in silver during that period of time and Table 3 shows the amounts to which $1 invested in silver would grow over various time intervals within the overall time span 1968-1983.

The distortions introduced into the silver market by the apparent attempt of the Hunt brothers to corner the market in 1979 and 1980 make the 1968-83 period atypical of normal or representative movements in the price of silver. Nevertheless, at least for the record, $1 invested in silver at the start of 1968 would have grown to $4.74 at the end of 1983, as indicated by Table 3. This represents a 10.2 percent annual rate of return (see Table 2). These figures fall far short of gold's performance over the same time interval, but greatly exceed the returns yielded by other assets.

TABLE 1

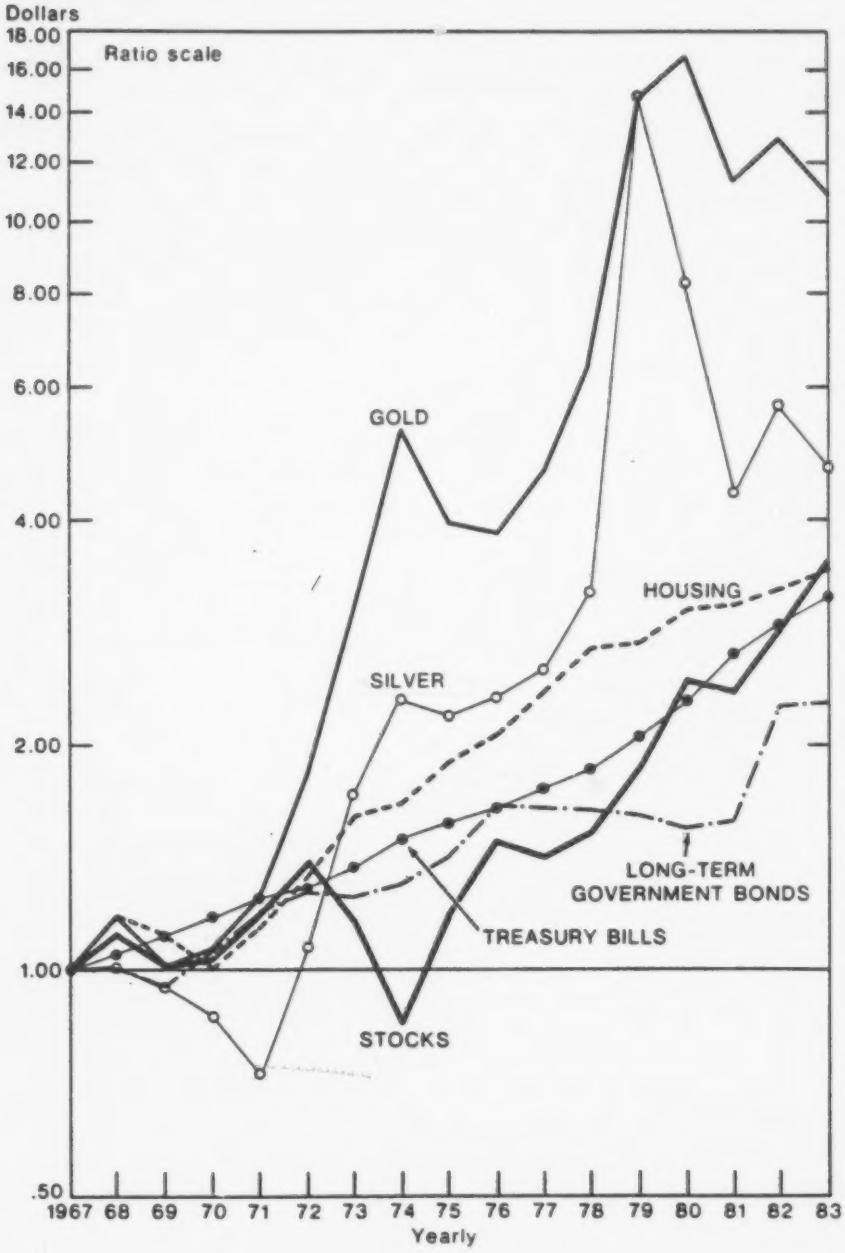
Wealth Indices of Six Alternative Investments

End of	L-T Govt Bonds	Tr. Bills	Housing	Stocks	Silver	Gold
1967	$1.00	$1.00	$1.00	$1.00	$ 1.00	$ 1.00
1968	1.00	1.05	1.19	1.13	1.01	1.19
1969	0.95	1.12	1.13	1.02	0.95	1.01
1970	1.06	1.19	1.00	1.03	0.87	1.07
1971	1.20	1.25	1.14	1.19	0.73	1.25
1972	1.27	1.29	1.34	1.41	1.08	1.85
1973	1.26	1.38	1.61	1.17	1.73	3.19
1974	1.31	1.50	1.68	0.85	2.31	5.31
1975	1.43	1.58	1.90	1.18	2.20	3.99
1976	1.67	1.66	2.07	1.49	2.31	3.83
1977	1.66	1.75	2.37	1.42	2.53	4.69
1978	1.64	1.87	2.70	1.52	3.21	6.42
1979	1.62	2.07	2.77	1.85	14.81	14.55
1980	1.56	2.30	3.02	2.46	8.28	16.65
1981	1.59	2.64	3.08	2.36	4.37	11.39
1982	2.24	2.91	3.23	2.84	5.77	12.98
1983	2.27	3.17	3.42	3.49	4.74	10.84

Source: Table 5 in Chapter II and Tables 3, 6, 8, 10, and 12 in the Appendix to Chapter III.

Chart 1

WEALTH INDICES OF SIX ALTERNATIVE INVESTMENTS



Source: Table I.

Housing. Most Americans did not invest in either gold or silver in the postwar period. Indeed, it was not legal for Americans to buy gold for investment purposes until the beginning of 1975. Thus the best inflation hedge for most Americans during the years 1968-1983 was home ownership. Table 4 in the Appendix to this chapter shows the median sales price of new one-family houses, monthly, 1968-1983, as published by the Department of Housing and Urban Development, Bureau of the Census, U.S. Department of Commerce.

Table 5 in the Appendix shows the annual rate of return on investment in home ownership, based on the median sales price of new one-family houses in Table 4. Table 6 is an alternative way of showing the same thing: it shows the amounts to which $1 invested in housing would grow over various time intervals. For the most part, home prices advanced rather steadily over the years 1968-1983 except for brief dips in 1969-1970 and some declines in the late seventies and early eighties when high mortgage interest rates made it difficult for many potential home buyers to finance purchases.

Table 6 indicates that a dollar invested in housing at the start of 1968 would have grown to $3.42 at the end of 1983. This represents an 8.0 percent annual rate of return. The rate of inflation over this period was 7.1 percent (see Table 3 in Chapter 2), so that on average home buying yielded a positive real rate of return.

Treasury Bills. Our measure of Treasury bill yields consists of one-month holding period returns for one-month bills, following the pioneering work of Ibbotson and Sinquefield.[6] Tables 7 and 8 in the Appendix to this chapter show, respectively, the annual rates of return on Treasury bills for various holding periods over the time span 1968-83, and the amount to which $1 invested in bills would have grown during that period.

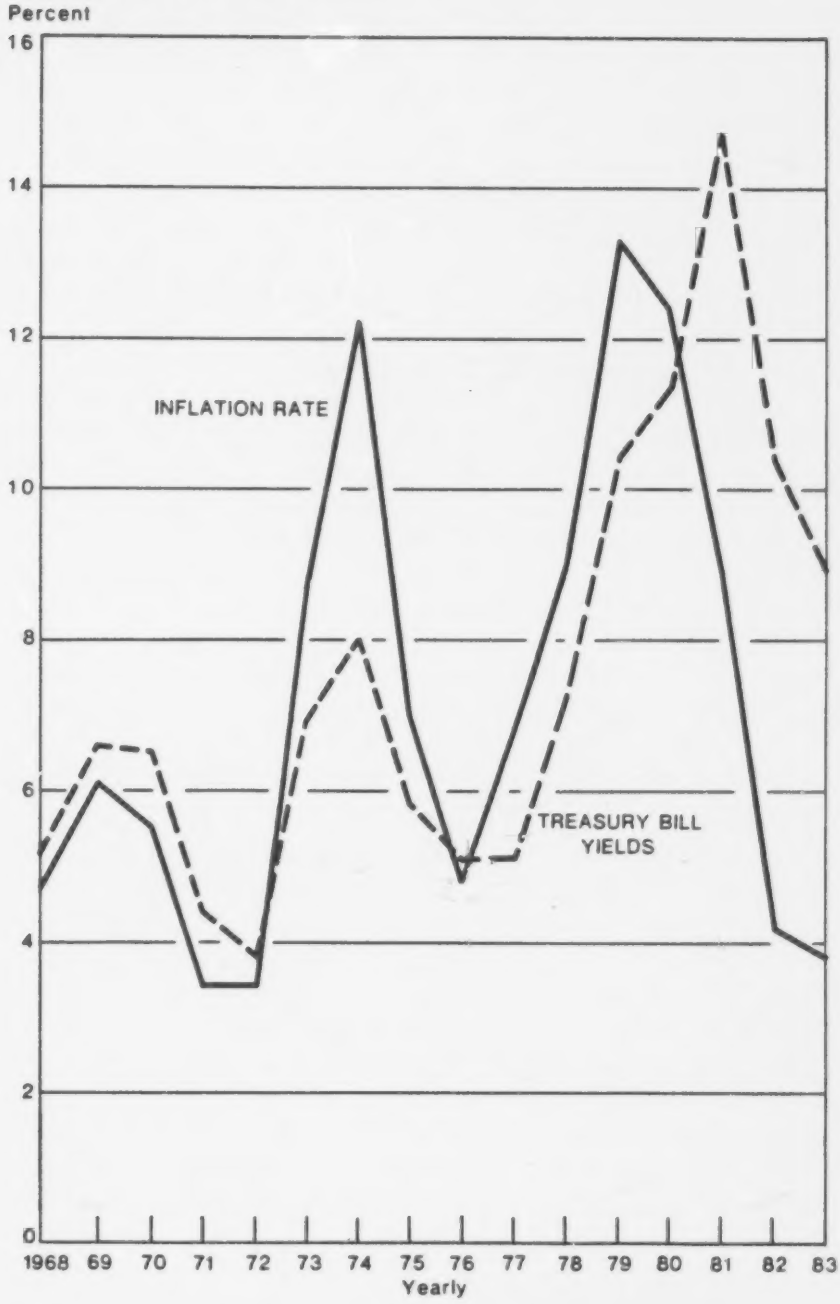
As Chart 2 indicates, Treasury bill yields were rather closely related to the inflation rate during most of the sixteen-year time span. In fact, the average annual rate of return on bills and the rate of inflation over the entire period are virtually identical: the annual yield on bills held from the start of 1968 to the end of 1983 was 7.5 percent, while the inflation rate over the same period was 7.1 percent per annum.

Putting the same thing somewhat differently: $1 invested in bills at the start of 1968 would have grown to $3.17 by the end of 1983; to keep exact pace with inflation and maintain the same purchasing power at the end of 1983 as at the beginning of 1968 would have required growth of $1 to $3.00.

[6]See Roger G. Ibbotson and Rex A. Sinquefield, *Stocks, Bonds, Bills, and Inflation: The Past and the Future* (Financial Analysts Research Foundation, 1982).

Chart 2

RATE OF RETURN ON TREASURY BILL YIELDS AND THE RATE OF INFLATION



Source: Table 3 in Chapter II and Table 7 in the Appendix to Chapter III.

Treasury bills thus provided a virtually zero *real* rate of return over the sixteen years. Compared to gold's positive 9.0 percent annual real rate of return, silver's positive 3.1 percent, and even housing's positive 0.9 percent, this does not look too rewarding. However, Treasury bills at least kept up with inflation and maintained purchasing power intact, which is more than can be said for long-term government bonds.

Stocks. In the fifties and sixties, the prevailing wisdom was that inflation was good for the stock market: that the way to combat inflation's erosion of purchasing power was to invest in stocks. The "prudent man" rule was thereupon duly reinterpreted to facilitate fiduciary acquisitions of equities in order to protect and indeed expand investor purchasing power despite rising prices. Unfortunately, the stock market disappointed many by delivering less than expected.

Tables 9 and 10 in the Appendix to this chapter show, respectively, the annual rates of return on stocks, and the amount to which $1 invested in the stock market would have grown, over the time span 1968-83. Our measure of stock market returns is calculated from a value-weighted index of all stocks on the New York Stock Exchange, which includes both capital gains (and losses) and dividends, with all dividends reinvested.

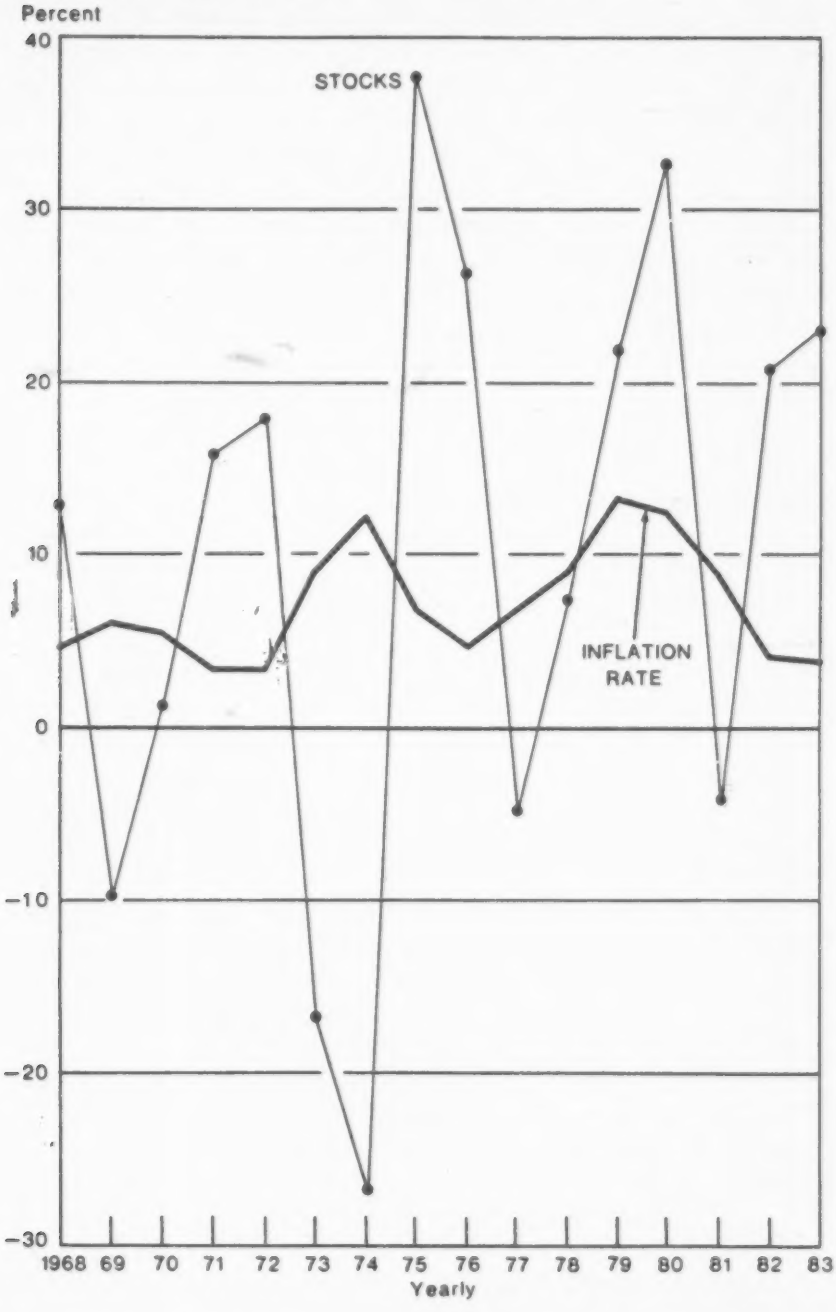
The tables show that the stock market was a poor inflation hedge for much of the period, with stock returns only 1 percent over the inflation rate after the full sixteen years. The average annual rate of return on stocks held from the start of 1968 to the end of 1983 was 8.1 percent, while the inflation rate over the same period was 7.1 percent per annum.

Nevertheless, for the holding period 1968-74 the average annual rate of return on stocks was negative (minus 2.2 percent) although the annual inflation rate over that interval was 6.3 percent. For the holding period 1968-81, stocks yielded 6.3 percent as against an inflation rate of 7.6 percent per annum. However, in the 1982 and 1983 period when inflation receeded to a 4 percent per annum, stocks yielded 21.7 percent.

Chart 3 shows the relation between the rate of return on stocks and the inflation rate on a year-to-year basis from 1968 through 1983. Inflation and stock prices moved in opposite directions more than twice as often as they moved in the same direction. By the end of the period, the Wall Street maxim "inflation is good for stock prices" had been replaced by its opposite: "inflation is bad for stock prices". (Now it is "lower interest rates" that are said to be good for stock prices.)

Chart 3

RATE OF RETURN ON STOCKS AND THE RATE OF INFLATION



Source: Table 3 in Chapter II and Table 9 in the Appendix to Chapter III.

Long-Term Government Bonds. Our measure for long-term government bonds, again following Ibbotson and Sinquefield, is a constant 20-year maturity bond portfolio. Returns include capital gains (and losses) as well as interest, with all interest reinvested. Tables 11 and 12 in the Appendix to this chapter show the rate of return and the amount to which $1 invested in long-term governments would have grown, both for the period 1968-83.

Tables 11 and 12 show that long-term government bonds have failed to keep up with inflation. Over the entire period, they yielded 5.3 percent per annum as compared with 7.1 percent inflation. To maintain constant purchasing power over the time span 1968 through 1983, $1 would have had to grow to $3.00. However, $1 invested in long-term government bonds would have grown to only $2.27; it would buy no more than what 76 cents would have bought in 1968.

The reason long-term bonds have performed so poorly is because their price is so sensitive to changes in interest rates. The longer a bond's maturity the more its price is affected, in the opposite direction, by a change in the general level of interest rates. For example, a rise in yield from 6 to 7 percent on a $10,000 face value 20-year bond, bearing a 6 percent coupon, involves a fall in price from $10,000 to $8,932. A similar rise in yield on a one-month security of similar coupon would involve a fall in price from $10,000 to only $9,990. Long-term government bonds were indeed yielding around 6 percent in the late sixties, yields that more than doubled by the early eighties with consequent erosion of capital values.

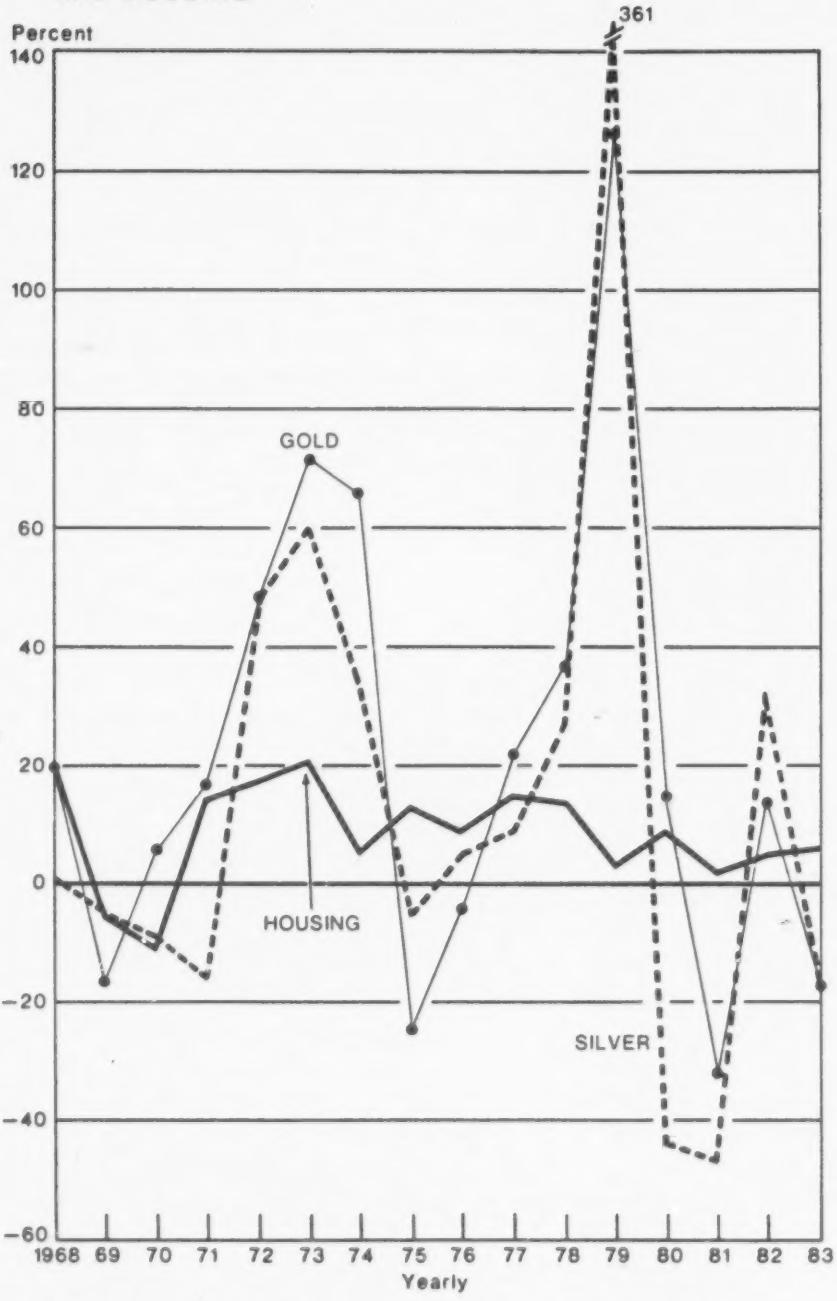
B. Relative Riskiness

It is commonplace in portfolio theory that most people are risk averse, so that higher anticipated returns are necessary to entice them to bear more risk. Since Aa bonds are poorer quality and thus riskier than Aaa bonds, for instance, Aa bonds need to carry a higher yield to induce investors to buy them; otherwise, everyone would prefer the Aaa securities. This section compares the relative riskiness of the six investments under consideration—namely, gold, silver, housing, Treasury bills, stocks, and long-term government bonds—during the period from the start of 1968 through the end of 1983.

Charts 4 and 5 show the annual rates of return on the six assets for one-year holding periods over the time span 1968-83. Chart 4 contains the three nonfinancial assets—gold, silver, and housing—while Chart 5 contains the three financial assets—stocks, long-term government bonds, and Treasury bills.

Chart 4

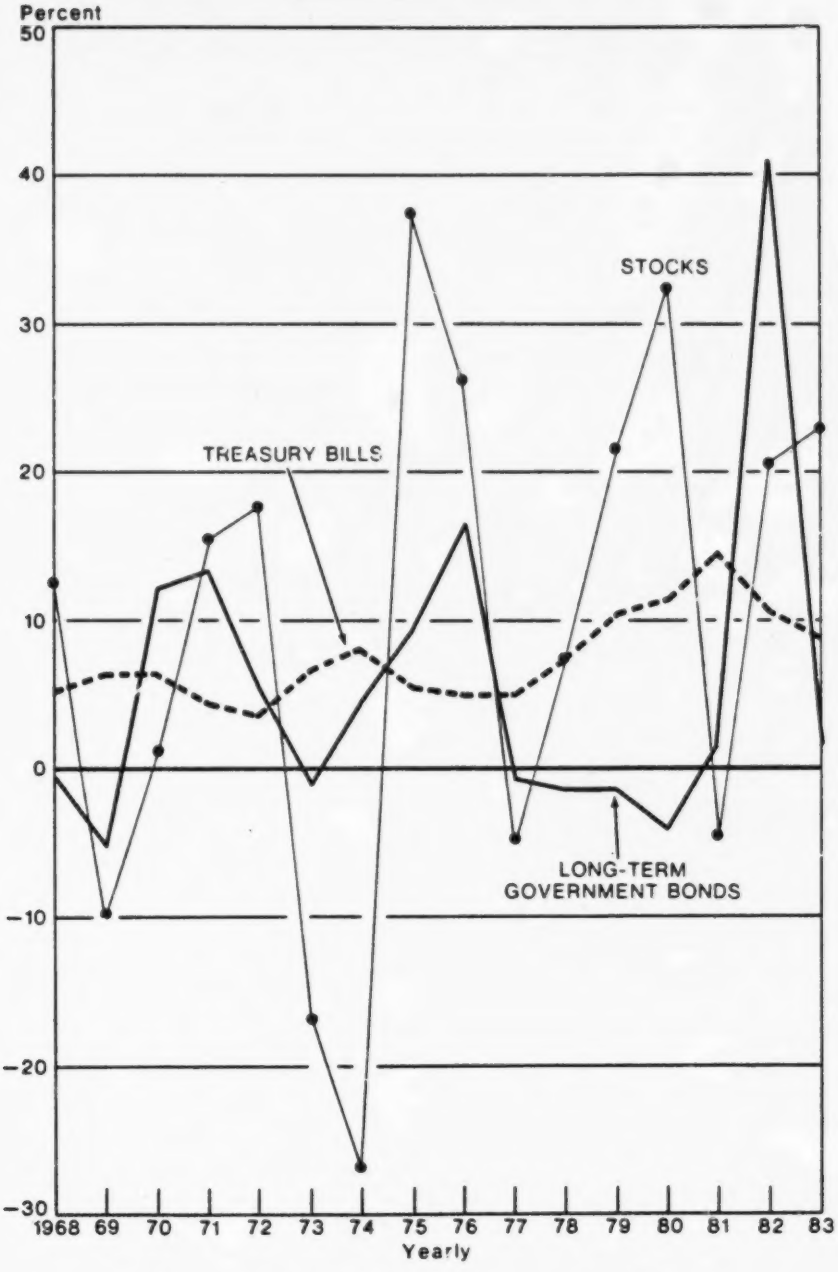
ANNUAL RATES OF RETURN ON GOLD, SILVER, AND HOUSING



Source: Table 2 in Chapter II and Tables 2 and 5 in the Appendex to Chapter III.

Chart 5

ANNUAL RATES OF RETURN ON STOCKS, LONG-TERM GOVERNMENT BONDS, AND TREASURY BILLS



Source: Tables 7, 9, and 11 in the Appendix to Chapter III.

Visual inspection of the charts indicates that gold, silver, and stocks have apparently been more volatile—and therefore riskier—than housing, long-term governments, and Treasury bills. For example, the annual rate of return on silver fluctuated between plus 361 percent (1979) and minus 47 percent (1981). Stocks fluctuated between plus 33 percent (1980) and minus 27 percent (1974). On the other hand, the rate of return on Treasury bills was much more predictable: the highest annual rate of return was 15 percent (1981) while the lowest was still positive—4 percent in 1972.

A conventional measure of risk is the standard deviation of the distribution of rates of return. As a measure of dispersion, in a normally distributed series of returns two-thirds of the returns will fall within one standard deviation on both sides of the average return, 95 percent within two standard deviations, and practically all of the returns within three standard deviations. Table 2 indicates that silver has been the most risky investment over the period, followed in order by gold, stocks long-term government bonds, housing, and Treasury bills.

TABLE 2

Standard Deviations, 1968-1983

Silver	1.36
Gold	.93
Stocks	.56
L-T Bonds	.39
Housing	.38
Bills	.03

Table 2 considers the riskiness of each asset in isolation. In the following chapter we examine them within the context of the riskiness of a total portfolio.

Appendix to Chapter III

The Underlying Data

TABLE 1

The Price of Silver Bullion, 1968-1983

	1968	1969	1970	1971	1972	1973	1974	1975
Jan.	$1.89	$1.98	$1.91	$1.60	$1.52	$2.05	$3.95	$4.10
Feb.	1.92	1.81	1.90	1.60	1.47	2.49	5.63	4.40
Mar.	2.23	1.80	1.89	1.70	1.58	2.23	5.33	4.22
Apr.	2.32	1.75	1.71	1.70	1.58	2.18	5.78	4.34
May	2.48	1.77	1.60	1.62	1.54	2.61	4.98	4.52
June	2.49	1.56	1.61	1.58	1.57	2.70	4.73	4.56
July	2.25	1.61	1.78	1.60	1.82	2.76	4.91	4.96
Aug.	2.23	1.66	1.84	1.51	1.90	2.62	4.10	4.57
Sept.	2.14	1.87	1.71	1.39	1.75	2.78	4.41	4.51
Oct.	1.92	1.97	1.80	1.31	1.83	2.86	4.91	4.16
Nov.	1.94	1.89	1.61	1.34	1.89	2.97	4.55	4.21
Dec.	1.90	1.80	1.64	1.38	2.04	3.27	4.37	4.17

TABLE 1

The Price of Silver Bullion, 1968-1983

	1976	1977	1978	1979	1980	1981	1982	1983
Jan.	$3.97	$4.47	$4.94	$ 6.75	$34.00	$13.40	$ 8.28	$13.86
Feb.	4.21	4.72	4.97	7.78	35.20	12.40	7.80	10.95
Mar.	4.08	4.79	5.41	7.43	14.25	11.90	7.06	10.40
Apr.	4.46	4.72	4.99	7.85	13.59	11.03	7.12	11.85
May	4.65	4.53	5.41	8.60	13.55	10.65	6.26	13.60
June	4.84	4.47	5.27	8.58	16.48	8.62	5.94	11.60
July	4.54	4.50	5.58	9.06	15.80	8.55	6.56	12.16
Aug.	4.15	4.45	5.51	10.48	16.15	9.19	7.97	12.04
Sept.	4.33	4.66	5.65	16.50	20.45	9.10	8.11	11.23
Oct.	4.33	4.86	6.17	16.40	18.90	9.17	10.01	8.75
Nov.	4.26	4.74	5.92	18.77	18.75	8.13	9.85	9.70
Dec.	4.38	4.78	6.07	28.00	15.65	8.25	10.90	8.95

Source: Handy and Harman. Noon price on last business day of month.

TABLE 2

Rate of Return on Silver, 1968-1983

TO THE END OF	FROM THE BEGINNING OF															
	1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	0.5%															
1969	−2.4	− 5.3%														
1970	−4.7	− 7.2	− 9.2%													
1971	−7.6	−10.1	−12.4	−15.6%												
1972	1.6	1.8	4.3	11.8	48.0%											
1973	9.6	11.5	16.1	26.0	53.9	60.0%										
1974	12.7	14.9	19.4	27.9	46.9	46.3	33.7%									
1975	10.4	11.9	15.0	20.6	31.8	26.8	12.9	−4.7%								
1976	9.8	11.0	13.5	17.8	26.0	21.0	10.2	0.1	5.0%							
1977	9.7	10.8	13.0	16.6	23.0	18.5	10.0	3.0	7.1	9.3%						
1978	11.2	12.3	14.5	17.8	23.6	19.9	13.2	8.6	13.4	17.8	27.1%					
1979	25.2	27.7	31.6	37.1	45.7	45.4	43.1	45.0	61.0	85.7	142.0	361.0%				
1980	17.7	19.2	21.7	25.3	31.0	29.0	25.1	24.0	30.3	37.5	48.5	60.5	−44.1%			
1981	11.1	12.0	13.5	15.9	19.6	16.8	12.3	9.5	12.1	13.5	14.6	10.8	−45.7	−47.3%		
1982	12.4	13.3	14.9	17.1	20.7	18.2	14.3	12.1	14.7	16.4	17.9	15.7	−27.0	−16.5	32.1%	
1983	10.2	10.9	12.1	14.0	16.9	14.4	10.6	8.3	10.0	10.8	11.0	8.1	−24.8	−17.0	4.2	−17.9%

Source: Table 1.

TABLE 3

Amount to Which $1 Invested in Silver Would Grow

TO THE END OF	FROM THE BEGINNING OF 1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	$ 1.01															
1969	0.95	$ 0.95														
1970	0.87	0.86	$ 0.91													
1971	0.73	0.73	0.77	$ 0.84												
1972	1.08	1.07	1.13	1.25	$ 1.48											
1973	1.73	1.72	1.82	2.00	2.37	$ 1.60										
1974	2.31	2.30	2.43	2.67	3.17	2.14	$1.34									
1975	2.20	2.19	2.31	2.55	3.02	2.04	1.27	$0.95								
1976	2.31	2.30	2.43	2.68	3.17	2.14	1.34	1.00	$1.05							
1977	2.53	2.52	2.66	2.92	3.46	2.34	1.46	1.09	1.15	$1.09						
1978	3.21	3.20	3.37	3.72	4.40	2.97	1.86	1.39	1.46	1.39	$1.27					
1979	14.81	14.74	15.56	17.13	20.29	13.71	8.57	6.41	6.72	6.40	5.86	$4.61				
1980	8.28	8.24	8.69	9.57	11.34	7.66	4.79	3.58	3.76	3.58	3.27	2.58	$0.56			
1981	4.37	4.34	4.58	5.05	5.98	4.04	2.52	1.89	1.98	1.89	1.73	1.36	0.29	$0.53		
1982	5.77	5.74	6.06	6.67	7.90	5.34	3.34	2.49	2.62	2.49	2.28	1.79	0.39	0.70	$1.32	
1983	4.74	4.71	4.97	5.47	6.49	4.38	2.74	2.05	2.15	2.05	1.87	1.47	0.32	0.57	1.09	$0.82

Source: Tables 1 and 2.

TABLE 4

Median Sales Price of New One-Family Houses, 1968-1983

	1968	1969	1970	1971	1972	1973	1974	1975
Jan.	$23,400	$24,600	$23,600	$23,900	$24,700	$29,900	$34,200	$37,200
Feb.	23,500	26,000	24,100	24,500	26,500	29,700	34,900	37,900
Mar.	24,600	26,200	24,100	24,300	27,400	31,400	36,000	38,800
Apr.	24,500	25,900	24,200	25,800	26,700	32,800	35,700	39,200
May	25,300	26,900	25,700	25,500	27,000	32,000	35,700	39,500
June	25,400	25,200	23,800	26,100	26,800	33,100	35,100	37,900
July	24,600	26,800	22,900	25,200	27,700	34,200	36,800	38,600
Aug.	25,000	24,900	23,500	25,300	28,100	33,200	35,700	38,200
Sept.	25,000	26,000	22,600	25,400	28,000	33,200	36,200	39,700
Oct.	25,600	24,400	22,100	25,600	28,900	33,300	37,200	40,700
Nov.	24,600	24,900	23,500	25,700	29,100	34,000	37,300	41,100
Dec.	26,500	25,100	22,300	25,300	29,700	35,700	37,400	42,100

TABLE 4

Median Sales Price of New One-Family Houses, 1968-1983

	1976	1977	1978	1979	1980	1981	1982	1983
Jan.	$41,600	$45,500	$52,300	$60,300	$62,900	$67,600	$66,200	$73,500
Feb.	42,700	47,400	53,200	61,200	64,900	66,200	65,700	73,800
Mar.	43,600	46,200	53,200	60,400	62,600	66,700	67,200	72,500
Apr.	43,300	48,700	53,300	62,600	63,100	68,700	70,200	74,700
May	43,600	49,300	55,700	62,800	63,100	70,800	69,300	74,500
June	46,100	48,700	56,700	64,200	64,900	68,800	69,300	75,800
July	44,600	48,600	54,800	63,800	64,000	69,500	70,900	75,200
Aug.	44,200	49,000	56,100	64,000	63,400	72,600	70,100	76,800
Sept.	44,700	48,500	57,300	66,000	68,300	65,800	67,800	81,000
Oct.	45,300	51,400	58,300	62,300	65,600	69,600	69,700	75,900
Nov.	45,800	51,800	58,700	63,900	66,700	71,200	73,500	75,900
Dec.	45,900	52,700	59,900	61,500	67,000	68,400	71,700	75,900

Source: Department of Housing and Urban Development, Bureau of the Census, U.S. Department of Commerce.

TABLE 5

Rate of Return on New One-Family Houses, 1968-1983

TO THE END OF	FROM THE BEGINNING OF 1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	19.4%															
1969	6.3	−5.3%														
1970	0.2	−8.3	−11.2%													
1971	3.3	−1.5	0.4	13.5%												
1972	6.0	2.9	5.8	15.4	17.4%											
1973	8.2	6.1	9.2	17.0	18.8	20.2%										
1974	7.7	5.9	8.3	13.8	13.9	12.2	4.8%									
1975	8.3	6.8	9.0	13.6	13.6	12.3	8.6	12.6%								
1976	8.4	7.1	9.0	12.8	12.7	11.5	8.7	10.8	9.0%							
1977	9.0	7.9	9.7	13.1	13.0	12.2	10.2	12.1	11.9	14.8%						
1978	9.4	8.5	10.2	13.2	13.1	12.4	10.9	12.5	12.5	14.2	13.7%					
1979	8.9	8.0	9.4	11.9	11.7	11.0	9.5	10.5	9.9	10.2	8.0	2.7%				
1980	8.9	8.0	9.3	11.6	11.4	10.7	9.4	10.2	9.7	9.9	8.3	5.8	8.9%			
1981	8.4	7.6	8.7	10.7	10.5	9.7	8.5	9.0	8.4	8.3	6.7	4.5	5.5	2.1%		
1982	8.1	7.4	8.4	10.2	9.9	9.2	8.1	8.5	7.9	7.7	6.4	4.6	5.3	3.5	4.8%	
1983	8.0	7.3	8.2	9.9	9.6	8.9	7.8	8.2	7.6	7.4	6.3	4.8	5.4	4.2	5.3	5.9%

Source: Table 4.

TABLE 6

Amount to Which $1 Invested in Housing Would Grow

TO THE END OF	FROM THE BEGINNING OF 1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	$1.19															
1969	1.13	$0.95														
1970	1.00	0.84	$0.89													
1971	1.14	0.95	1.01	$1.13												
1972	1.34	1.12	1.18	1.33	$1.17											
1973	1.61	1.35	1.42	1.60	1.41	$1.20										
1974	1.68	1.41	1.49	1.68	1.48	1.26	$1.05									
1975	1.90	1.59	1.68	1.89	1.66	1.42	1.18	$1.13								
1976	2.07	1.73	1.83	2.06	1.81	1.55	1.29	1.23	$1.09							
1977	2.37	1.99	2.10	2.36	2.08	1.77	1.48	1.41	1.25	$1.15						
1978	2.70	2.26	2.39	2.69	2.37	2.02	1.68	1.60	1.42	1.31	$1.14					
1979	2.77	2.32	2.45	2.76	2.43	2.07	1.72	1.64	1.46	1.34	1.17	$1.03				
1980	3.02	2.53	2.67	3.00	2.65	2.26	1.88	1.79	1.59	1.46	1.27	1.12	$1.09			
1981	3.08	2.58	2.73	3.07	2.70	2.30	1.92	1.83	1.62	1.49	1.30	1.14	1.11	$1.02		
1982	3.23	2.71	2.86	3.22	2.83	2.41	2.01	1.92	1.70	1.56	1.36	1.20	1.17	1.07	$1.05	
1983	3.42	2.86	3.02	3.40	3.00	2.56	2.13	2.03	1.80	1.65	1.44	1.27	1.23	1.13	1.11	$1.06

Source: Tables 4 and 5.

TABLE 7

Rate of Return on Treasury Bills, 1968-1983

TO THE END OF	FROM THE BEGINNING OF 1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	5.2%															
1969	5.9	6.6%														
1970	6.1	6.5	6.5%													
1971	5.7	5.8	5.5	4.4%												
1972	5.3	5.3	4.9	4.1	3.8%											
1973	5.6	5.6	5.4	5.0	5.4	6.9%										
1974	5.9	6.0	5.9	5.8	6.2	7.5	8.0%									
1975	5.9	6.0	5.9	5.8	6.1	6.9	6.9	5.8%								
1976	5.8	5.9	5.8	5.7	5.9	6.5	6.3	5.4	5.1%							
1977	5.7	5.8	5.7	5.6	5.8	6.2	6.0	5.3	5.1	5.1%						
1978	5.9	5.9	5.9	5.8	6.0	6.4	6.2	5.8	5.8	6.2	7.2%					
1979	6.2	6.3	6.3	6.3	6.5	6.9	6.9	6.7	6.9	7.6	8.8	10.4%				
1980	6.6	6.7	6.8	6.8	7.0	7.5	7.5	7.5	7.8	8.5	9.6	10.8	11.3%			
1981	7.2	7.3	7.4	7.5	7.8	8.2	8.4	8.5	8.9	9.7	10.9	12.1	13.0	14.7%		
1982	7.4	7.6	7.6	7.7	8.0	8.5	8.6	8.7	9.1	9.8	10.8	11.7	12.1	12.5	10.4%	
1983	7.5	7.6	7.7	7.8	8.1	8.5	8.6	8.7	9.1	9.7	10.4	11.1	11.3	11.3	9.6	8.9%

Source: Ibbotson and Sinquefield, *op. cit.*, and Federal Reserve Bank of New York.

TABLE 8

Amount to Which $1 Invested in Treasury Bills Would Grow

TO THE END OF	FROM THE BEGINNING OF 1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	$1.05															
1969	1.12	$1.07														
1970	1.19	1.14	$1.07													
1971	1.25	1.18	1.11	$1.04												
1972	1.29	1.23	1.15	1.08	$1.04											
1973	1.38	1.32	1.23	1.16	1.11	$1.07										
1974	1.50	1.42	1.33	1.25	1.20	1.15	$1.08									
1975	1.58	1.50	1.41	1.32	1.27	1.22	1.14	$1.06								
1976	1.66	1.58	1.48	1.39	1.33	1.28	1.20	1.11	$1.05							
1977	1.75	1.66	1.56	1.46	1.40	1.35	1.26	1.17	1 10	$1.05						
1978	1.87	1.78	1.67	1.57	1.50	1.45	1.35	1.25	1.18	1.13	$1.07					
1979	2.07	1.97	1.84	1.73	1.66	1.60	1.49	1.38	1.31	1.24	1.18	$1.10				
1980	2.30	2.19	2.05	1.93	1.85	1.78	1.66	1.54	1.45	1.38	1.32	1.23	$1.11			
1981	2.64	2.51	2.35	2.21	2.12	2.04	1.91	1.77	1.67	1.59	1.51	1.41	1.28	$1.15		
1982	2.91	2.77	2.60	2.44	2.34	2.25	2.10	1.95	1.84	1.75	1.67	1.56	1.41	1.27	$1.10	
1983	3.17	3.02	2.83	2.66	2.54	2.45	2.29	2.12	2.01	1.91	1.82	1.69	1.54	1.38	1.20	$1.09

Source: Table 7.

TABLE 9

Rate of Return on Stocks, 1968-1983

TO THE END OF	FROM THE BEGINNING OF															
	1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	12.8%															
1969	0.9	−9.8%														
1970	1.0	−4.4	1.3%													
1971	4.5	1.9	8.3	15.8%												
1972	7.1	5.7	11.4	16.8	17.8%											
1973	2.6	0.7	3.5	4.3	− 1.1	−16.9%										
1974	−2.2	−4.5	−3.4	−4.6	−10.5	−22.0	−26.8%									
1975	2.1	0.6	2.5	2.7	− 0.3	−5.7	0.4	37.7%								
1976	4.5	3.5	5.6	6.3	4.5	1.4	8.4	31.9	26.3%							
1977	3.5	2.6	4.2	4.6	2.9	0.1	4.9	18.3	9.6	−4.8%						
1978	3.9	3.0	4.6	5.0	3.5	1.3	5.4	15.5	8.9	1.1	7.4%					
1979	5.3	4.6	6.2	6.7	5.7	4.0	8.0	16.7	12.0	7.6	14.4	21.9%				
1980	7.2	6.7	8.4	9.1	8.4	7.2	11.2	19.3	15.9	13.4	20.2	27.2	32.7%			
1981	6.3	5.8	7.2	7.8	7.0	5.9	9.2	15.6	12.3	9.6	13.6	15.7	12.7	−4.2%		
1982	7.2	6.8	8.2	8.8	8.2	7.3	10.4	16.2	13.4	11.4	15.0	17.0	15.3	7.5	20.7%	
1983	8.1	7.8	9.2	9.8	9.3	8.6	11.6	16.9	14.5	13.0	16.2	18.1	17.1	12.4	21.7	23.0 %

Source: Center for Research in Securities Prices, Graduate School of Business, University of Chicago.

TABLE 10

Amount to Which $1 Invested in Stocks Would Grow

TO THE END OF	FROM THE BEGINNING OF 1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	$1.13															
1969	1.02	$0.90														
1970	1.03	0.91	$1.01													
1971	1.19	1.06	1.17	$1.16												
1972	1.41	1.25	1.38	1.36	$1.18											
1973	1.17	1.04	1.15	1.13	0.98	$0.83										
1974	0.85	0.76	0.84	0.83	0.72	0.61	$0.73									
1975	1.18	1.04	1.16	1.14	0.99	0.84	1.01	$1.38								
1976	1.49	1.32	1.46	1.44	1.25	1.06	1.27	1.74	$1.26							
1977	1.42	1.25	1.39	1.37	1.19	1.01	1.21	1.66	1.20	$0.95						
1978	1.52	1.35	1.49	1.47	1.27	1.08	1.30	1.78	1.29	1.02	$1.07					
1979	1.85	1.64	1.82	1.80	1.55	1.32	1.59	2.17	1.57	1.25	1.31	$1.22				
1980	2.46	2.18	2.42	2.39	2.06	1.75	2.11	2.88	2.09	1.65	1.74	1.62	$1.33			
1981	2.36	2.09	2.31	2.28	1.97	1.68	2.02	2.75	2.00	1.58	1.66	1.55	1.27	$0.96		
1982	2.84	2.52	2.79	2.76	2.38	2.02	2.43	3.33	2.41	1.91	2.01	1.87	1.53	1.16	$1.21	
1983	3.49	3.09	3.43	3.39	2.92	2.48	2.99	4.08	2.96	2.35	2.47	2.30	1.88	1.42	1.48	$1.23

Source: Table 9.

TABLE 11

Rate of Return on Long-Term Government Bonds, 1968-1983

TO THE END OF	FROM THE BEGINNING OF 1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	−0.3%															
1969	−2.7	−5.1%														
1970	2.0	3.2	12.1%													
1971	4.7	6.4	12.7	13.2%												
1972	4.9	6.2	10.3	9.4	5.7%											
1973	3.9	4.7	7.3	5.8	2.2	−1.1%										
1974	3.9	4.7	6.7	5.4	2.9	1.6	4.4%									
1975	4.6	5.3	7.1	6.2	4.5	4.1	6.8	9.2%								
1976	5.9	6.7	8.5	7.9	6.8	7.1	10.0	12.9	16.8%							
1977	5.2	5.8	7.3	6.6	5.5	5.5	7.2	8.2	7.7	−0.7%						
1978	4.6	5.1	6.3	5.6	4.6	4.4	5.5	5.8	4.7	−0.9	−1.2%					
1979	4.1	4.5	5.5	4.8	3.8	3.6	4.3	4.3	3.2	−1.0	−1.2	−1.2%				
1980	3.5	3.8	4.6	3.9	2.9	2.6	3.1	2.9	1.7	−1.8	−2.1	−2.6	−3.9%			
1981	3.4	3.6	4.4	3.7	2.8	2.5	3.0	2.8	1.7	−1.0	−1.1	−1.1	−1.1	1.9%		
1982	5.5	5.9	6.8	6.4	5.8	5.8	6.6	6.9	6.6	5.0	6.1	8.1	11.3	19.9	41.0%	
1983	5.3	5.6	6.5	6.0	5.5	5.4	6.1	6.3	6.0	4.5	5.4	6.7	8.8	13.4	19.7	1.6%

Source: Ibbotson and Sinquefield, *op. cit.*, and Salomon Brothers.

TABLE 12

Amount to Which $1 Invested in Long-Term Bonds Would Grow

TO THE END OF	FROM THE BEGINNING OF 1968	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83
1968	$1.00															
1969	0.95	$0.95														
1970	1.06	1.06	$1.12													
1971	1.20	1.20	1.27	$1.13												
1972	1.27	1.27	1.34	1.20	$1.06											
1973	1.26	1.26	1.33	1.18	1.05	$0.99										
1974	1.31	1.31	1.38	1.23	1.09	1.03	$1.04									
1975	1.43	1.43	1.51	1.35	1.19	1.13	1.14	$1.09								
1976	1.67	1.68	1.77	1.57	1.39	1.32	1.33	1.28	$1.17							
1977	1.66	1.66	1.75	1.56	1.38	1.31	1.32	1.27	1.16	$0.99						
1978	1.64	1.64	1.73	1.55	1.37	1.29	1.31	1.25	1.15	0.98	$0.99					
1979	1.62	1.62	1.71	1.53	1.35	1.28	1.29	1.24	1.13	0.97	0.98	$0.99				
1980	1.56	1.56	1.64	1.47	1.30	1.23	1.24	1.19	1.09	0.93	0.94	0.95	$0.96			
1981	1.59	1.59	1.68	1.49	1.32	1.25	1.26	1.21	1.11	0.95	0.96	0.97	0.98	$1.02		
1982	2.24	2.24	2.36	2.11	1.86	1.76	1.78	1.71	1.56	1.34	1.35	1.36	1.38	1.44	$1.41	
1983	2.27	2.28	2.40	2.14	1.89	1.79	1.81	1.73	1.59	1.36	1.37	1.39	1.40	1.46	1.43	$1.02

Source: Table 11.

IV. Looking Forward: The Role of Gold In a Modern Investment Portfolio

A. Gold as a Hedge Against Inflation

From 1950 through 1983, the cost of living in the United States, as measured by the Consumer Price Index, increased in every year but one (1955). The annual rate of inflation over the entire 33-year period averaged 4½ percent. Although the inflation rate averaged 2.2 percent a year during the fifties and sixties, it tripled to over 7 percent a year in the seventies. Inflation reached double-digit figures three times in this time span: in 1974 (12.2 percent), 1979 (13.3 percent), and 1980 (12.4 percent).

It is apparent that the pace of inflation has accelerated over the past three decades. Although it is impossible to know what will happen over the remaining years of the twentieth century, not to mention thereafter, prudence dictates that a hedge against inflation be built into modern investment portfolios. Inflation at the rate of 5 percent a year doubles the price level every 14 years; at the rate of 7 percent annually it doubles the price level every 10 years. In light of recent experience, any portfolio management that ignores the potential wealth-eroding effects of continued inflation should be held grossly negligent.

A generation ago, the stock market was widely viewed as a good hedge against inflation. However, as indicated in Chapter III, the stock market has yielded disappointing results. In *real* terms, the Dow-Jones Industrial Average peaked in the mid-sixties and has yet to fully recover. Over the 16-year period from the start of 1968 to the end of 1983, the *real* annual rates of return on the six assets considered in the previous chapters were as shown in Table 1.

Gold has fared much better than the other listed assets in the inflationary environment of 1968-83. Whether or not it will continue to do as well in the future no one can say with certainty, but of the six assets listed it has been the best inflation hedge over the past decade and a half.

The value of gold as an inflation hedge over the period 1968-83 is corroborated by the coefficients of correlation between the rate of inflation and rates of return on these assets over the same time period. Table 2 shows such correlation coefficients calculated in two

different ways. The first column contains correlation coefficients calculated on the basis of monthly data. The second column contains similar coefficients but calculated on the basis of annual data.

TABLE 1

Real Rates of Return, 1968-1983

Asset	Nominal Rate of Return	Minus	Rate of Inflation	Equals	Real Rate of Return
Gold	16.1%		7.1%		9.0%
Silver	10.2		7.1		3.1
Stocks	8.1		7.1		1.0
Housing	8.0		7.1		.9
Bills	7.5		7.1		.4
L-T Bonds	5.3		7.1		−1.8

TABLE 2

Correlation Coefficients, 1968-1983

Correlation between Inflation and:	Based on Monthly Data	Based on Annual Data
Bills	.43	.53
Gold	.12	.52
Silver	.07	.44
Housing	−.04	−.12
L-T Bonds	−.12	−.47
Stocks	−.19	−.22

A positive correlation coefficient means that two variables—such as the rate of inflation and the rate of return on Treasury bills—move in the same direction, while a negative coefficient means that as one variable goes up the other goes down. On the basis of correlation coefficients, the best inflation hedges are bills, gold, and silver. Housing, bonds, and stocks have negative coefficients, whether calculated with monthly or actual data.[7]

[7]For those interested, a full correlation matrix containing all the variables involved looks like the following (annual data, 1968-1983):

	Bills	Gold	Silver	Housing	Bonds	Stocks	CPI
Bills	1.00						
Gold	− .05	1.00					
Silver	.10	.82	1.00				
Housing	− .39	.22	− .04	1.00			
Bonds	− .01	− .18	− .09	− .13	1.00		
Stocks	− .02	− .22	.06	.15	.28	1.00	
CPI	.53	.52	.44	− .12	− .47	− .22	1.00

Additional confirmation of gold as an inflation hedge comes from the widely-quoted Salomon Brothers annual survey of annual rates of return on a wide variety of assets. Table 3 contains the results of the Salomon Brothers survey for periods of 15, 10, and 5 years ending in mid-1983. The numbers differ somewhat from the numbers we have been using because of differences in dating—the Salomon survey uses mid-year figures rather than end-of-year data—and differences in measurement methods.

As Table 3 indicates, over the 15-year time span gold ranked fourth, over the 10-year time span fifth, and over the 5-year time span third among the fourteen investments surveyed. Rare coins and stamps, the only two consumer investment-type assets yielding higher returns than gold over the full 15 years, both require specialized knowledge and expertise not needed for investment in gold.

B. Diversification with Gold Can Reduce Risk

Another way of viewing gold as an investment is to examine the riskiness of a total portfolio with and without the inclusion of gold. At first glance, it would appear that adding gold to a portfolio would make the portfolio more risky, because gold itself is among the more risky investments. We saw in Chapter III, for example, that gold, with a 93 percent standard deviation of its rates of return over the years 1968-83, was second only to silver in variability.

Nevertheless, under many circumstances the addition of gold can *reduce* total portfolio risk because the rate of return on gold fluctuates *opposite* to the rate of return on stocks. Based on annual data from 1968 through 1983, the correlation coefficient between gold and the stock market is $-.22$: when inflation accelerates, the price of gold typically goes up while the stock market typically goes down; when inflation subsides, the price of gold typically falls while the stock market typically rises.

The beta of an asset is a measure of its sensitivity to movements in the market as a whole. A beta coefficient greater than 1 means that an asset's returns are more volatile than rates of return for the market as a whole, thereby increasing the overall riskiness of a portfolio.[8] A beta coefficient less than 1 means that an asset's returns are less volatile than the market as a whole, thereby decreasing overall portfolio risk. A zero beta indicates a riskless asset whose returns do not vary at all with the market as a whole. Treasury bills, for example, with a beta typically close to zero, are widely considered the riskless asset *par excellence*.

[8]Volatility is that part of total variablity of an asset due to co-movements with the market portfolio. It is measured by an asset's beta and indicates the amount of risk that an asset adds to the overall market portfolio.

TABLE 3

Salomon Brothers Survey: Annual Rates of Return

	1968-1983		1973-1983		1978-1983	
	Rate of Return	Rank	Rate of Return	Rank	Rate of Return	Rank
Oil	20.4%	1	25.4%	2	16.2%	4
U.S. Coins	17.9	2	25.7	1	13.2	6
U.S. Stamps	16.8	3	19.2	3	21.8	1
Gold	16.6	4	15.5	5	17.5	3
Chinese Ceramics	14.2	5	4.0	14	13.1	7
Silver	12.6	6	17.3	4	19.7	2
Diamonds	10.1	7	10.3	7	5.4	13
Farmland	10.0	8	11.7	6	7.0	12
Treasury Bills	8.8	9	10.1	8	12.8	8
Housing	8.6	10	9.2	9	7.4	10
Old Masters	7.8	11	8.4	10	4.1	14
Cons. Price Index	7.3	12	8.5	11	9.1	9
Bonds	6.4	13	6.6	13	7.2	11
Stocks	5.7	14	7.5	12	14.8	5
Foreign Exchange	3.1	15	1.4	15	−2.8	15

Source: Salomon Brothers Inc. All returns are for the period ended June 1, 1983.

Table 4 shows betas, calculated on the basis of monthly data, for bills, housing, gold, bonds, and silver, each relative to the stock market as a whole (with the stock market represented by a value-weighted index of all stocks on the New York stock exchange). The table contains betas calculated using the full 16-year period, 1968-1983, and also for two five-year subperiods, 1968-72 and 1973-77, and the remaining six-year subperiod 1978-83.

TABLE 4

Betas Relative to the Stock Market

	1968-1983	1968-72	1973-77	1978-83
Bills	−.004	−.004	−.01	−.01
Housing	.05	−.06	−.01	.18
Gold	.16	.04	−.15	.58
L-T Bonds	.25	.22	.13	.40
Silver	.48	.37	.03	1.06

For the full 16-year time span, the replacement of part of an all-stock portfolio with gold would have reduced total risk: the beta of .16 for gold means that on average every time the stock market went down 10 percent gold fell only 1.6 percent, while every time the market went up 10 percent gold rose only 1.6 percent. Of course, the replacement of part of an all-stock portfolio with Treasury bills and housing would have reduced risk exposure even more, since their betas of close to zero indicate that their returns are virtually independent of what happens in the stock market.

The fact of the matter is that most people do not hold all of their investments in the form of stocks. They have some stocks, but they also own other investment-type assets: their homes, for instance, and if account is taken of their pension funds, they own a fair amount of long-term bonds as well. For this reason, it is unrealistic for individuals to calculate betas only with reference to the stock market when considering whether including gold in a consumer investment portfolio would increase or decrease total portfolio risk.

Table 5 shows betas again, calculated once more on the basis of monthly data. For Table 5, however, they have not been calculated relative to the stock market as a whole. Instead, the "market as a whole" has been redefined as a package consisting of one-third stocks, one-third long-term bonds, and one-third housing, a bundle of assets that is more representative of a typical consumer investment portfolio that 100 percent investment in the stock market. The table

again contains betas for the full 16-year period, 1968-1983, and the three sub-periods presented in Table 4.

TABLE 5

Betas Relative to Stocks, Bonds, and Housing (⅓ Each)

	1968-1983	1968-72	1973-77	1978-83
Bills	−.01	−.01	−.01	−.01
Gold	.41	.19	−.22	.80
Silver	.69	.20	−.06	1.25

The betas in Table 5 are larger than in Table 4. They measure the sensitivity of an asset to movements in a total package consisting of equally proportioned dollar amounts of stocks, bonds, and housing. A beta coefficient greater (less) than 1 means than an asset's returns are more (less) volatile than rates of return for the total stocks-bonds-housing package, thereby increasing (decreasing) overall portfolio risk.

For the full 16-year time span, replacement of part of an equally proportioned stocks-bonds-housing portfolio with gold would again have reduced total risk: the beta of .41 for gold means that on average every time the stocks-bonds-housing package went up (or down) 10 percent, gold rose (or fell) only 4.1 percent.

C. How Much Gold Should Be in a Modern Consumer Portfolio?

We have seen that over the period 1968-1983 gold has been a high-yielding investment, with a nominal rate of return of 16.1 percent per annum and a real rate of return of 9.0 percent. We have also seen that over these 16 years gold has provided a good hedge against inflation. In addition, although it is risky *per se*, when added to a conventional portfolio it has provided diversification that *reduces* rather than increases total portfolio risk. Under the circumstances, it appears obvious that the historical record justifies a role for gold in a modern portfolio. The only question is: how much of a role? How much gold should there be in a modern consumer portfolio?

The answer to such a question has to be qualified. We have been interpreting historical relationships and the past is not always a good guide to the future. Will world political conditions stabilize or continue unsettled? Will inflation be as serious a problem in the future as it has been in the past decade and a half? Will real

interest rates remain at the relatively high levels of the early eighties or return to the relatively low levels of the late seventies? These and related questions are paramount when it comes to evaluating the place of gold in a consumer investment portfolio.

Everyone will answer such questions their own way. Someone who anticipates increased worldwide political tensions, worse inflation, and low real interest rates will naturally see gold playing a larger role in his or her portfolio than someone who expects detente, less inflation, and high real interest rates.

Not knowing the future any better than anyone else, in place of forecasting we have made an attempt to quantify the portfolio implications of the past. Assuming that the remaining years of the century resemble the period 1968-83, we have constructed Tables 6 and 7 based on the past rates of return and standard deviations of the assets we have been considering in this monograph.

Table 6 shows rates of return and corresponding risk levels, as measured by the standard deviation of the total portfolio, of alternative investments in (a) the stock market, (b) gold, and (c) Treasury bills. For example, a portfolio invested 100 percent in the stock market would yield an 8.12 percent annual rate of return with an accompanying risk level, as measured by the standard deviation, of 55.76 percent (see top left-hand corner box).

Moving to the right along the top row of Table 6 shows the implications of replacing stocks with gold. Investing 75 percent of a portfolio in gold instead of stocks, for instance, raises the annual rate of return from 8.12 percent to 14.08 percent, and simultaneously

TABLE 6

Portfolio Alternatives Among Stocks, Bills, and Gold

		25% Gold	50% Gold	75% Gold	100% Gold
100% Stocks	8.12%	10.11%	12.09%	14.08%	16.06%
	55.76	49.72	56.33	72.19	92.67
25% Bills	7.96	9.95	11.93	13.92	
	41.78	37.85	49.57	69.43	
50% Bills	7.80	9.79	11.77		
	27.82	28.02	46.20		
75% Bills	7.64	9.63			
	13.96	23.03			
100% Bills	7.48				
	2.91				

increases the level of risk from 55.76 to 72.19 percent. A portfolio that is invested 100 percent in gold would yield 16.06 percent and carry a risk equal to 92.67 percent (see top right-hand corner box).

Moving *down* along the left-hand column of Table 6 shows the implications of replacing stocks not with gold but with Treasury bills. Indeed, moving down along any column always shows the implications of adding more bills. Investing 75 percent of a portfolio in Treasury bills in place of stocks, for instance, lowers the annual rate of return from 8.12 percent to 7.64 percent, and also lowers risk from 55.76 to 13.96 percent. A portfolio invested 100 percent in Treasury bills would yield 7.48 percent and carry a level of risk equal to 2.9 percent (see bottom lefthand corner box).

The boxes in the remainder of the table show the implications of allocating a portfolio among some of each of the three alternatives. Moving to the right shows the effects of adding gold, moving down the effects of adding Treasury bills. For example, as we have seen, investing 75 percent of a portfolio in gold, with 25 percent remaining in the stock market, would yield 14.08 percent at a risk level of 72.19 percent. Taking 25 percent of that portfolio out of stocks and moving it into Treasury bills would result in a portfolio composed of 75 percent gold and 25 percent bills; according to Table 6, such a portfolio would yield 13.92 percent annual rate of return at a risk level of 69.43 percent.

Alternatives like those presented in Table 6 cannot by themselves determine an optimum portfolio, because people differ in the amount of risk they want to bear. Aggressive investors, willing to bear more risk in hopes of obtaining a higher yield, will buy more gold; defensive investors, who prefer a more certain yield even though it may be lower, will buy more Treasury bills. For any given rate of return, however, less risk is always preferable to more; and for any given level of risk, a higher return is always preferable to a lower one.

According to Table 6, moving to the right along the top row and giving up some stocks for gold will increase yield *and* reduce risk up to the combination of 25 percent gold-75 percent stocks. At that combination one can expect a 10.11 percent annual rate of return at a risk level of 49.72 percent.

However, Table 6 is unrealistic for consumer portfolios because it is built on the assumption of an all-stock portfolio. As we have observed earlier in this chapter in conjunction with betas, many people do not hold all of their investments in the form of stocks; they also own their own homes and long-term bonds (in their pension funds).

TABLE 7

Portfolio Alternatives Among Stocks-Bonds-Housing, Bills, And Gold

		5% Gold	10% Gold	15% Gold	20% Gold	25% Gold	30% Gold	35% Gold	40% Gold
100% Stocks-									
Bonds- Housing	7.12	7.57	8.01	8.46	8.91	9.35	9.80	10.25	10.70
	29.85	29.33	29.56	30.51	32.11	34.29	36.93	39.95	43.26
5% Bills	7.14	7.58	8.03	8.48	8.92	9.37	9.82	10.27	10.71
	28.35	27.85	28.13	29.17	30.89	33.18	35.94	39.06	42.47
10% Bills	7.15	7.60	8.05	8.50	8.94	9.39	9.84	10.28	10.73
	26.85	26.37	26.71	27.85	29.69	32.10	34.98	38.22	41.73
15% Bills	7.17	7.62	8.07	8.51	8.96	9.41	9.86	10.30	10.75
	25.35	24.89	25.31	26.55	28.51	31.06	34.07	37.41	41.02
20% Bills	7.19	7.64	8.08	8.53	8.98	9.43	9.87	10.32	10.77
	23.86	23.42	23.91	25.27	27.37	30.06	33.19	36.66	40.36
25% Bills	7.21	7.66	8.10	8.55	9.00	9.44	9.89	10.34	10.79
	22.36	21.95	22.53	24.02	26.27	29.10	32.37	35.94	39.75
30% Bills	7.23	7.67	8.12	8.57	9.02	9.46	9.91	10.36	10.80
	20.87	20.49	21.17	22.80	25.21	28.20	31.59	35.28	39.18
35% Bills	7.25	7.69	8.14	8.59	9.03	9.48	9.93	10.38	10.82
	19.38	19.04	19.83	21.62	24.20	27.34	30.87	34.67	38.67
40% Bills	7.26	7.71	8.16	8.60	9.05	9.50	9.95	10.39	10.84
	17.89	17.59	18.51	20.48	23.24	26.54	30.21	34.12	38.21

Table 7 has been constructed on the same principles as Table 6 except that the all-stock alternative has been replaced by a package consisting of one-third stocks, one-third long-term government bonds, and one-third housing (in the same way as when we calculated betas—see Table 5 as compared with Table 4). The risk levels are generally lower in Table 7 than in Table 6, and the returns as well, because the market return used to construct Table 7 has more diversification built into it than the market return in Table 6.

Table 7 indicates that moving to the right along the top row and replacing 5 percent of the stocks-bonds-housing package with gold will increase yield *and* lower risk. Moving to 10 percent of the portfolio in gold will increase yield further, and increase risk as well, but overall portfolio risk will still be less than that of a 100 percent stocks-bonds-housing portfolio.

On average, a benchmark range of 5 to 10 percent of one's total investment portfolio in gold appears warranted and prudent in light of the historical record. Within that range, the proportion that is appropriate for any particular individual depends on such factors as how one views the future—in terms of the outlook for world tensions, inflation, and the level of real interest rates—and how much risk one feels comfortable bearing.

Those who anticipate increased world tensions, rising inflation, and low real interest rates, and who feel comfortable bearing risk, will want to go to the 10 percent level if not beyond. While those who expect an easing of world tensions, less inflation, high real interest rates, and who dislike risk, may well find 5 percent too much. For most investors, however, the evidence indicates that somewhere between 5 and 10 percent of one's portfolio in gold is appropriate.

Appendix to Chapter IV:

Transactions Costs Associated with Different Forms of Gold

This appendix discusses the transactions costs associated with investing in gold. The cheapest way to purchase gold, in terms of transactions costs per ounce, is 100-ounce bars—both because the volume of ounces purchased lowers the cost per ounce and because of the enhanced liquidity of the market for bars of this size. Small investors who do not want to purchase gold in a 100-ounce size have to pay higher transactions costs per ounce. Below, we give examples of the typical costs associated with a round-trip transaction of purchasing and then selling gold in 100-ounce bars, 1-ounce bars, gold coins and accumulation plans.

1) ***100-ounce gold bars.*** 100-ounce gold bars are the cheapest way to purchase gold per ounce. The cost of buying or selling these bars is 1% of the spot price plus $130. Assuming a spot price of $400 an ounce at the London fix, the purchase price per ounce would be $405.30 and the selling price per ounce would be $394.70, giving a round-trip cost of $10.60 per ounce:

	Purchase Price	Sales Price
Spot Price/ounce	$400.00	$400.00
× 100 ounces	100	100
Spot Price per bar	$40,000	$40,000
× 1%	+ 400	− 400
$130	+ 130	− 130
Price per 100 ounces	$40,530	$39,470
÷ 100	÷ 100	÷ 100
Cost per ounce	$405.30	$394.70

Cost of a round-trip transaction = $405.30 − 394.70 = $10.60

2) ***Accumulation Plans.*** In an accumulation plan the investor agrees to make regular purchases of a minimum dollar amount of gold for a specific time interval—say a minimum of $2000 per

month for six months. The broker pools the small order together with all the other accumulation plans to form large purchases (or sales) that are executed in the 100-ounce bar market to reduce the transactions cost per ounce. The benefit of the accumulation plan is that the investor is able to buy small fixed-dollar amounts of gold with relatively low transactions costs. The purchase price in the accumulation plan is $1 over the spot price plus a 2% commission. The sales price is $1 under spot minus a 2% commission. If the spot price was $400 the purchase price per ounce would be $409.02 while the sales price would be $391.02, giving an $18 total cost:

	Purchase	Sale
Spot price	$400.00	$400.00
$1 differential	+ 1.00	− 1.00
2% commission	+ 8.02	− 7.98
	$409.02	$391.02

Cost of a round-trip transaction = $409.02 − 391.02 = $18

3) ***Small Gold Bars.*** The most liquid size of small bars (bars less than 100 ounces) is the 1-ounce bar. The purchase price for a minimum purchase of 10 one-ounce bars, is 1.25% over spot plus a 2% commission. The sales price is 2% under spot. Given a $400 spot price for gold the purchase and sale price are $413.10 and $392 respectively, giving a round-trip cost of $21.10:

	Purchase Price	Sales Price
Spot	$400.00	$400.00
Fabrication cost 1.25%	+ 5.00	
2% Commission	+ 8.10	− 8.00
	$413.10	$392.00

Cost of a round-trip transaction = $413.10 − 392.00 = $21.10

4) ***Gold Coins.*** The two major gold coins are the South African Krugerrand and the Canadian Maple Leaf. In the United States these coins (and also probably the Mexican Peso and Austrian Korona) trade at the same price. However, in the international market (e.g.

Europe) the Krugerrand tends to be more widely recognized because of substantial marketing and greater volume outstanding. The result is that the Krugerrand may tend to maintain its premium slightly better than some of the other coins. The purchase price of one-ounce gold coins (for a minimum of five coins) is 3.5% over spot plus a 2% commission. The sales price would be 3.5% (to 3%) over spot minus $5 (bid/ask spread) minus a 2% commission. Assuming a $400 spot price the purchase and sales price would be $422.28 and $400.82 respectively, giving a $21.46 round-trip cost:

	Purchase Price		Sales Price
Spot	$400.00	Spot	$400.00
Premium 3.5%	+ 14.00	Premium	+ 14.00
2% Commission	+ 8.28	Bid/ask spread	− 5.00
	$422.28	2% Commission	− 8.18
			$400.82

Cost of a round-trip transaction = $422.28 − 400.82 = $21.46

These examples give the costs for a round-trip transaction assuming that the investor does not take physical delivery of the gold. If the investor takes physical delivery, he must pay local sales tax. Alternatively, he can avoid sales tax and leave the gold with a depository which is usually insured. The storage costs are relatively small.

Additionally, per ounce commission on gold purchases decrease as the volume of ounces increases. The pricing formulas given above for the cost of investing in gold will also change if the per ounce price of gold changes substantially.

There are also several ways to indirectly invest in gold. For example, an investor may purchase stock in gold mining companies, futures contracts in gold, and options contracts in gold or in gold futures. However, a full description of these methods is beyond the scope of this monograph.

V. Summary

Under the traditional domestic and international gold standard, each nation used to set an official price for gold and then stand ready to buy or sell unlimited amounts at that price. The market price thus became identical with the official price.

The United States went off the domestic gold standard in the early 1930s but remained on the gold standard internationally, with gold officially priced at $35 an ounce. The U.S. Treasury did business at that price only with foreign governments and official international monetary institutions. Gold coin and bullion were not allowed in private hands domestically.

In 1961, faced with a heavy private demand for gold in London and Zurich, eight of the world's leading financial nations established a "gold pool" to keep the market price from rising above the $35-an-ounce official price. The gold pool broke down in March of 1968 and was replaced by a "two-tier" gold price system, with all official transactions taking place at $35 an ounce but private transactions able to take place at a market price that was free to vary with supply and demand.

The two-tier system also broke down in 1973 and with it what was left of the international gold standard. Since then, gold has been free to find its own price, unencumbered by governmental interference or any "official" price. And since December 31, 1974, Americans have once again been allowed to own gold.

It is not likely that the United States will return to a gold standard in any form in the foreseeable future. Thus there will be no "official" price of gold but only a free market price determined by supply and demand.

With respect to supply and demand, the overwhelming element on the supply side is not the amount of current output, which is usually only about 1 to 2 percent of the total stock in existence, but uncertainty regarding how much holders of the existing stockpile might decide to sell. On the demand side, a variable portion of the demand for gold is motivated by psychological considerations—in particular, by periodic fears regarding an uncertain social and economic future. Traditionally, gold has been considered a hedge against inflation, with demand expanding when inflation accelerates and contracting when inflation subsides.

From early 1968, when the central banks abandoned fixing the price of gold through their gold pool, to the end of 1983, six major trends are discernible in the price of gold: (1) From early 1968 to the end of 1974, the market price rose from $35 an ounce to $197; (2) From January 1975 to August 1976, the price fell from almost $200 an ounce to just over $100; (3) From August 1976 to near the end of January 1980, the price skyrocketed from $104 to an all-time high of $875 an ounce; (4) From January 1980 to June 1982, the price retreated irregularly from its $875 an ounce peak to slightly below $300; (5) From June 1982 to the close of the year, the price of gold rose from $296 an ounce to $450 an ounce; (6) From January 1983 to December 1983, the price of gold see-sawed on a downward trend from a peak of about $500 in January to about $380 an ounce at year end.

Overall, from the beginning of 1968 to the end of 1983, the market price of gold rose from $35 to about $380 an ounce, which amounts to a 16.1 percent per annum nominal rate of increase. With an inflation rate of 7.1 percent over that time span, this means a 9.0 percent per annum "real" rate of return.

Over the same period, silver yielded a nominal 10.2 percent annual rate of return, stocks 8.1 percent, housing 8.0 percent, Treasury bills 7.5 percent, and long-term government bonds 5.3 percent.

In terms of wealth, $1 invested in gold at the start of 1968 would have grown to $10.84 by the end of 1983. Alternatively, $1 invested in silver would have grown to $4.74; $1 in stocks to $3.49; $1 in housing to $3.42; $1 in Treasury bills to $3.17; and $1 in long-term government bonds to $2.27.

With respect to riskiness, silver has been the most volatile and therefore most risky investment over the period, followed in order by gold, stocks, long-term government bonds, housing, and Treasury bills.

A generation ago, the stock market was widely viewed as a good hedge against inflation. However, since the mid-sixties it has yielded disappointing results. Between 1968 and 1983, on a year-to-year basis, inflation and stock prices moved in opposite directions more than twice as often as they moved in the same direction.

Gold, on the other hand, has done well as an inflation hedge. Based on monthly data over the period 1968-1983, the rate of return on gold and the rate of inflation have a correlation coefficient equal to .12; based on annual data over the same period, the correlation coefficient between gold and inflation is .52. In either case, the

correlation between inflation and gold is higher than between inflation and any of the other assets considered in this study, with the exception of Treasury bills. Bills are the most reliable—that is, the least risky—inflation hedge of all, but they have a low real rate of return. Housing, long-term government bonds, and stocks have negative correlation coefficients with respect to inflation: when inflation went up, they went down.

Although gold is risky in itself—second only to silver among the assets considered—under many circumstances the addition of gold to a portfolio can *reduce* total portfolio risk. This is because the rate of return on gold has fluctuated opposite to the rate of return on stocks: when inflation accelerates, for example, the stock market typically falls while the price of gold typically rises.

For the period 1968-83, gold has a beta of .16 relative to the stock market as a whole, indicating that gold's returns have been less volatile than those of the stock market. The substitution of gold for part of an all-stock portfolio would thus have decreased total portfolio risk.

Typical consumers, however, do not hold an all-stock portfolio. They own their homes and often a fair amount of long-term bonds in their pension funds. For the 16 years 1968-83, gold has a beta of .41 calculated not with reference to the stock market as a whole but rather with reference to a total package consisting of one-third stocks, one-third long-term government bonds, and one-third housing. This bundle of assets is more representative of a typical consumer's investment portfolio than 100 percent investment in the stock market. The beta of .41 indicates that the substitution of gold for part of this portfolio would again have decreased total portfolio risk.

Thus although it is risky in and of itself, when added to a conventional portfolio gold can provide diversification that reduces rather than increases total portfolio risk. Since it has yielded a high rate of return, it can also enhance total earnings. Under the circumstances, it appears obvious that the historical record justifies a place for gold in a modern portfolio. How much of a place? How much gold should there be in a modern consumer portfolio?

We conclude that on average 5 to 10 percent of one's total investment portfolio in gold is warranted and prudent, although the proportion that is appropriate for any particular individual depends on such factors as how one views the future and how much risk one feels comfortable bearing.

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